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New Station at Springfield.

The Boston and Albany R.R. have recently started the model electric light plant which they have been installing for some time past in their new and elegant depot at Springfield, Mass.

The two depot buildings, situated on either side of the track, are connected together by underground cables carried through the steam-heating conduits. The dynamo room is connected with the depot by a pole line 1,200 feet long.

Oil is used for fuel, being sprayed under the boilers with air, both under high pressure, virtually producing a natural gas flame of intense heat. The Aerated Fuel Company, of Springfield, have furnished this part of the plant, and their claim that their method of fuel supply is eight times as cheap as coal seems in a fair way to be substantiated.

Steam for heating purposes and for the engines is furnished by a battery of four large Norcross boilers. Two Westinghouse high-speed engines of 50 horse power each furnish power for the dynamos. The engines are set in line and connected with the same shaft on which is placed an American friction clutch.

There are three dynamos; two 500-light Edison direct current incandescent machines and one 16-light Brush arc machine. The Edison machines run 1,211 revolutions per minute when the engines run 320.

The wiring was done by the N. E. Wiring and Construction Company, of Boston, and the dynamos were furnished by Paine & Francis. The buildings are wired up to their full capacity of 1,000 lights, but at present only about 600 will be used. The arc lights will be used in lighting the yard and driveway approaching the depot.

The Various Uses of Electricity.

The world has as yet scarcely begun to comprehend the varied uses to which electrical force may be put. The peculiarity which distinguishes this force is its easy and cheap transmissibility. Given a wire, and force generated 10, 15, 20 or more miles distant may be transmitted wherever needed. This is causing unused power in many places where it has been supposed beyond the reach of man's dominion to come under his control. Mountain streams in Switzerland, heretofore valued only as objects of curiosity sight-seers, now contribute to the prosperity of villages five or 10 miles beneath them. From the dalles of the St. Louis, where a river falls 500 feet, near Duluth, power is to be furnished by electricity, which will not only light the city, but give an enormous amount of power for other uses. Near the seashore, ocean tides, whose power exceeds that of all the steam engines in the world, will very probably be largely changed to electrical force, and thus be made useful to mankind beyond what could now be thought possible.

An electric battery for firing shots to loosen up hard ore has been introduced at Dahlonega. The machine is about 9x18 inches, and it is capable of firing 16 shots simultaneously, which is a wonderful improvement, to say the least of it, compared with the old process of one and two shots and having to wait several minutes.

Rowland on the Velocity of Electricity.

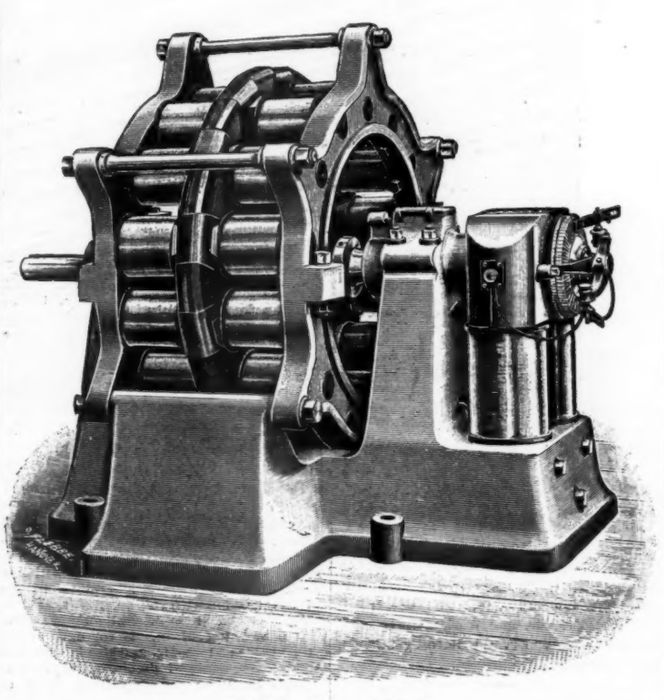
We have in the case of electrical waves along a wire a disturbance outside the wire, and a current within it, and the equations of Maxwell allow us to calculate these with perfect accuracy, and give all the laws with respect to them, writes H. A. Rowland. We thus find that the velocity of propagation of the waves along a wire, hung far away from other bodies and made of good conducting material, is that of light, or 185,000 miles per second; but when it is hung near any conducting material, like the earth, or enclosed in a cable and sunk in the sea, the velocity becomes much less. When hung in space, away from other bodies, it forms, as it were, the core of a system of waves in the ether, the amplitude of the disturbance becoming less and less as we move away from the wire. But the most curious fact is that the electric current penetrates only a short distance into the wire, being mostly confined to the surface, especially where the number of oscillations per second is very great.

Pittsburgh's New Electric Road.

The Pleasant Valley Street Railway Company, Pittsburgh, Pa., is pushing as rapidly as possible everything in connection with the conversion of the road into an electric line and its equipments. Twenty-one new cars have been ordered, the contract for their construction being given to Bell & Co., of Philadelphia. The cars are to be as well finished and quite as comfortable as those on either of the Pittsburgh or traction lines.

A Magnetic Plant.

It is stated that there has been discovered in the forests of India a strange plant which possesses to a very high degree astonishing magnetic power. The hand which breaks a leaf from it receives immediately a shock equal to that which is produced by the conductor of an induction coil. At a distance of six metres a magnetic needle is affected by it and it will be quite deranged if brought near. The energy of this singular influence varies with the hour of the day. All powerful about 2 o'clock in the afternoon, it is absolutely annulled during the night. At times of storm its intensity augments to striking proportions. During rain the plant seems to succumb and bends its head during a thunder shower; it remains there without force or virtue, even if one should shelter it with an umbrella. No shock is felt at that time in breaking the leaves and the needle is unaffected beside it. One never by any chance sees a bird or insect alight on the electric plant; an instinct seems to warn them that they would there find sudden death. It is also important to remark that where it grows none of the magnetic metals are found; neither iron, nor cobalt, nor nickel, an undeniable proof that the electric force belongs exclusively to the plant.



THE KAPP ALTERNATOR.

Electric Power on the Rhine.

An interesting experiment is about to be tried at Rheinfelden, on the Rhine, of distributing electric power over a radius of 15 miles. Turbines aggregating 15,000 horse-power are to be erected at the above named town. Several dynamos of 500,000 watts each (2,000 volts and 250 amperes) are to be coupled in series, it being proposed to work at a pressure of about 8,000 volts.

The Kapp Alternator.

We are indebted to our valued contemporary *Industries*, of London, for the description and cut of the Kapp alternator illustrated herewith:

"Schio, a small town in northern Italy, has now a central electric light station, which has been erected to the order of a local company by the Oerlikon Engineering Works. The generating and transforming plant is of the Kapp type, made by the Oerlikon firm, and we illustrate herewith one of the two alternators at this station. In this machine the armature has an iron core, composed of thin band iron coiled upon a cast iron supporting ring, and provided with fibre driving horns, by which the armature coils are supported. The field magnet cores are cylindrical, and of wrought iron 4⅛ inches diameter, secured at their outer ends in cast iron yoke rings, and provided at their inner ends with rectangular pole shoes, between which the armature revolves. On the armature there are 14 coils, each consisting of 80 turns of 120 mils. wire wound in two layers, and the armature resistance is 1.8 ohms. There are 28 magnets, each wound with 186 turns of wire, and the total field resistance with all the magnet coils in series is 1.76 ohms. The machine, when driven at 600 revolutions per minute, is intended for an output of 30 amperes at 2,000 volts terminal pressure; but, on trial, has been loaded up to 40 amperes. As will be seen from our illustration, an exciting dynamo is combined with the alternator, the magnets of the exciter being fitted into a prolongation of the main bed plate, whilst the armature is mounted on the spindle of the alternator. This dynamo is used not only for exciting the field of the alternator, but also for lighting the station. The speed was, during the test, kept constant at 600 revolutions per minute, and the terminal pressure was noted for different degrees of excitation, no current being allowed to flow through the armature of the alternator:

Exciting current. Amperes.	Exciting energy. Watts.	Terminal pressure. Volts.
9	142	1,000
14.5	368	1,700
17	510	2,000
18	573	2,100
21	775	2,400

When a current of 30 amperes was allowed to pass through the armature, the terminal pressure of 2,000 volts was obtained with an exciting current of 21 amperes. This requires an expenditure of energy for excitation of 775 watts, or about 1.3 per cent. of the total output; whilst the loss in the armature due to its resistance is 2.7 per cent."

A new company entitled the Société Française d'Accumulateurs Electriques (Faure-Sellon-Volckmar) has been formed in Paris by Messrs. Philippart Bros., for the manufacture, exploitation and development of the secondary battery. The address of the new society is 181 Rue de la Pompe, and the capital is fixed at 1,100,000f., with power to increase to 2,000,000f. The company take over the patents of Faure, Sellon and Volckmar, and Philippart. The first directors are MM. Gilbert Le Guay, senator; Adolphe Klingelhœfer, landowner; Martin Rée, merchant; Bernard Lœwenstein, banker, of Brussels; Edouard Limauge, late broker at Brussels.

The Zell Improved Safety Boiler.

In the new Waterhouse electric light station in Baltimore, our attention was called to the excellent results obtained from a new 500 horse-power Zell improved safety boiler. As these new style of boilers are entering largely into use, we give herewith a brief description of it.

By reference to the cut it will be seen that this generator consists of a series of four-inch lap-welded tubes, placed in an inclined position in sections of two, which are expanded at their ends into oblong shaped headers or end boxes. These headers are made of special iron; are carefully proportioned in the distribution of metal, to effect strength and durability; they withstand a hydrostatic pressure of 800 pounds per square inch. The sections are placed in vertical rows, bringing the tubes in a staggered position, and are connected together top and bottom with short pieces of four-inch tubes or nipples, expanded in the length and number of sections varying with the power of boiler required. The front of the generator contains one row of headers more than the rear end; both front and rear headers are connected to the under side of the water drums, and are connected to them with nipples expanded into the bottom of the drums. The top headers at the front end each contain two four-inch tubes extending horizontally back, and are expanded into the steam drum; this drum is connected to the water drums and rests on two iron upright pieces or saddles, which sustains the weight of the steam drum; they are connected together by expanded tubes. Thus the generator is put together without a single screw or bolted flange joint.

The drums are each made of steel, having a tensile strength of 60,000 pounds per square inch; the tube plates into which the tubes are expanded have the holes accurately cut, are of extra thickness, and riveted to the drums. The heads are heavy and convex, and made of flange steel; each drum is provided with a manhole, faced off, in its end. The mud-drum, which is made of cast-iron, the best metal to withstand corrosion, is placed below the bottom of rear headers, which is below the line of circulation, and is connected by nipples expanded into the headers; it has handholes on the rear side for inspection or cleaning.

The headers have handholes and plates opposite the tubes. *These plates are placed on the inside of the headers;* both the surfaces of the plates and headers are accurately milled so as to form a perfect joint; the plates are held in proper position by bolts, the heads of which are held in slots in the outer face of the plates, thus being protected from the water, steam and gases, providing against corrosion of the iron in the bolts.

It will be seen that the pressure of the steam holds the plates up to a joint without the aid of the bolts, which could be dispensed with when there is pressure in the boiler; the higher the pressure, the closer and tighter the plates are held in their places; the plan adopted in other boilers of putting these plates or caps on the outside and securing them by bolts from the inside, is a practice full of danger; for if the threads strip, or the bolts break under steam pressure, the plate will fly off and the steam and the boiling water would rush out, to the danger of every one in the vicinity. Moreover, the bolts are liable to corrode when they are in contact with the water on the inside of the boiler, which will in time weaken the iron. Plates of this description, when the joints leak, cannot be screwed up to tighten them while the steam is on, except at great risk, for, in addition to the duty of making and preserving a tight joint, it has to withstand the augmented strain to resist the steam pressure upon its whole area; and as these plates may be removed to clean or repair the tubes, by screwing the nuts so often the threads are in consequence of the great strain subjected to an increased wear. This will account for the fact that nearly all other sectional boilers are leaky about these plates—they are tightened up when cold; but when the pressure of the steam comes upon them, they are forced off and cannot then be tightened.

The rear end of the boilers rests upon two cast-iron saddles placed under the mud-drum; the front end rests upon a roller which is placed upon the top of the arch-box. This box is bolted firmly to the boiler front and rests at its ends on brackets bolted to the side columns and, being independent of the surrounding brick-work, the boiler is free to move with expansion and contraction without injury to the walls.

The arch over the furnace door is cast iron, through which there is a constant circulation of cold air. It is also covered by fire-brick lining, which protects it from the heat. It is a great improvement over the ordinary fire-brick arches which are so generally used upon other boilers, and which have so often to be renewed, causing delay and expense. The fronts are all of new designs, and are made of *wrought iron*, with cast-iron trimmings; they never crack, warp or twist out of shape.

We were shown also a 500-h. p. boiler of this type at the International Telegraph District and Construction Company's station giving very economical results. The Campbell & Zell Company, of Baltimore, have evidently entered the electric light and power field with a boiler specially perfected for use in such stations.

Some Additional Exhibits at the Niagara Falls Convention.

James H. Pentz represents the Pentz-Reckenzaun meter, exhibits that very pretty little affair, which was unfortunately kept out of sight for want of a proper current by which to exhibit it at work on a circuit at his room in the hotel.

The American Indurated Fibre Co., represented by Mr. R. Coleman, exhibited a variety of fibre pipe for underground electric wires. The material used is compressed wood fibre, chemically treated. The properties claimed are that it is moisture and gas proof, and is a perfect insulator. Put together like gas pipe. It is coming into notice rapidly and is already in use in several cities. Junction boxes and lateral connections are neatly and perfectly arranged for by devices both simple and easily made perfect.

Fairbanks & Co., Fairbanks, Brown & Co., and the Western Valve Co., have a joint exhibit of vulcabeston insulating material made into all sorts of forms and shapes for electric work. Standard asbestos disc globe valves, asbestos packed cocks, and vulcabeston rope packing for steam joints.

The Ellis Lubricator Company, represented by Mr. S. Holbrook, show a bearing cup, in which the flow of oil from full to empty is regulated perfectly, regardless of the quantity in the cup. This is a valuable acquisition, accomplished by replacing every drop escaping by a bubble of air, drawn from the top through the air itself. A cylinder cup with but one connection is also shown. The separate parts of this are removable, to clean or change, without stopping the steam flow or interfering with the work of the engine. Temperature changes are not possible with this apparatus.

Jas. W. Queen & Co., Philadelphia, have a fine showing of meters for current and pressure measurements, and also bridges and other instruments of precision. Ayrton & Perry's certificate accompanying those of the above which are of foreign manufacture, while of their own home manufacture there are some beautiful specimens of bridges, singly and in combination, bearing the test certificate of Prof. Anthony.

The New York Phonograph Company, represented by Mr. D. H. Darrin, furnishes abundant amusement for the multitude, by its startling expressions, cute remarks and quaint witticisms.

The Standard Carbon Co., of Cleveland, has a fine display of carbons of every size and form, sheet as well as cylinder, and there is also found the Seymour Universal Carbon Holder, a neat, convenient little affair manufactured by A. P. Seymour, Syracuse, N. Y. The form of carbon motor brushes made for the Sprague people is also shown.

The Underwood Manufacturing Company, of Tolland, Conn., exhibits its cotton leather belting, which is an especial manufacture for electric light purposes. Belts of this description are running several of the Paris Exposition exhibits.

Mr. H. E. Webb, representing the Solar Carbon and Manufacturing Company, of Pittsburgh, exhibits carbons from the full-grown size, 8x52 inches, used by the Cowles Smelting Works, down to ⅛x12 inches. All forms of battery plates and batteries complete are also seen. Samples of natural gas coke carbon, an example of the conversion of a gaseous into a solid form of material, attract much attention from thinking men.

Messrs. C. McIntire & Company, of Newark, N. J., have a fine display of all sorts of wire joints, except the bell-hanger variety. Anything in the shape of a McIntire joint is warranted to fit, and cannot, properly made, leak, being not only electrically tight, but water and steam proof even as well.

The Eureka Tempered Copper Company, at North East, Pa., manufacture copper boxes of a specially recommended metal, a successor to the Babbit metals for high speed machinery, advances apparently good arguments warranting its use for purposes designated. The exhibitor is kept busy by interested interrogators.

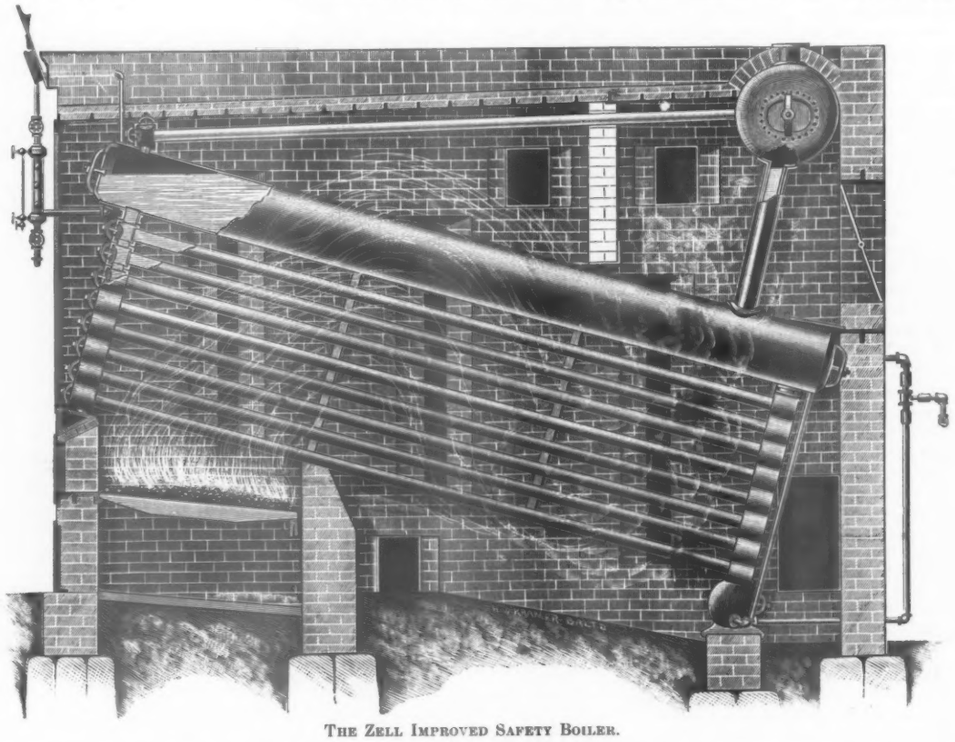
A Promising Western Company.

The River and Rail Electric Company, of Denver, Colo., have filed articles of incorporation with the Secretary of State and have opened their offices at No. 1,517 Larimer street, Denver. The capital stock of the company is $500,000, fully paid up, and the officials elected at the meeting of the Board of Directors held recently, to act for the first year, are as follows: President, O. Metcalf; vice-president, J. Thos. Lynch; general manager, Stetson Leach, and secretary and treasurer, W. F. Reed.

The River and Rail Electric Light Company of New York, having sold to this subcompany the right for Colorado, they are now prepared for business, and on the first of September they will have one of their tram-cars, run by the storage battery system, in operation on one of the street railways in Denver.

Already the question of storage batteries for the illumination of private residences, public buildings, etc., is being agitated and a number of plants have been contracted for. The Union Bank of that city is now lighted by the battery system and so far has given entire satisfaction. The fact that the light is of excellent quality, not being directly dependent on a dynamo the danger of fire being reduced to a minimum, the light being always on hand, like gas, to be turned on whenever wanted and the total absence of any danger to life or property, from the current becoming short-circuited, has been the cause of a number of prominent citizens earnestly considering the subject for the illumination of their residences and business houses.

Negotiations are now pending for the adoption of the tram-car in a number of the cities of Colorado. The great objection which has been raised to the overhead wires and conduits, have resulted in the different railway companies throughout the State making a thorough investigation of the storage battery systems, and a number of the companies have about decided to adopt the latter, owing to the better facilities given for transportation and the great reduction in the cost of the same, both for construction and operation.



THE ZELL IMPROVED SAFETY BOILER.

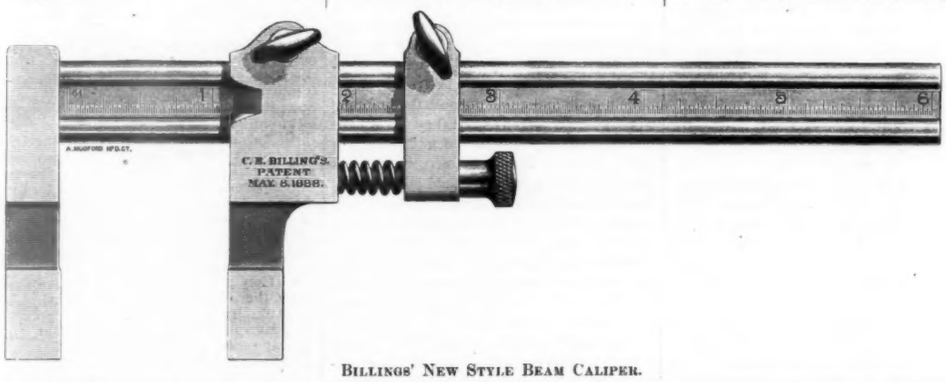
The common council at East Saginaw, Mich., has passed an ordinance granting the Union Street Railway Company the right to introduce electricity as a motive power on its main line and branches. The new plant will cost $75,000, and work will be commenced at once. Several Detroit gentlemen are interested in the project.

We understand that the electric cars at Atlantic City, N. J., are very crowded now with passengers at that popular seaside resort, and that the electric railway is growing in popularity every day on account of the speed which the cars attain, and the reliability of the service which they give. The cars now in operation at this place make 18 complete trips daily over the entire road, or nearly 120 miles per day per car. This, considering the fact that each car draws a tow car, and that both motor car and the tow car are often overcrowded, as only excursion cars can be crowded, is a good record. The cars at this place are in constant service, the operating company, the Pennsylvania Railway Company, keeping no reserved cars, so great is their confidence in the reliability of the apparatus. The Pennsylvania Company has ordered an additional number of cars, and their officers speak very highly of the operation of this street railway.

Billings' New Style Beam Caliper.

We illustrate herewith a new and improved slide gauge invented by Mr. Billings, of the Billings & Spencer Company, of Hartford, Conn. It will be seen that in the construction of the beam a radical departure has been made, with the result of securing what appear to be important advantages. The beam is made of three pieces, two of which are pieces of steel wire about $\frac{1}{8}$" diameter. Along this wire, grooves are milled, to closely fit the edge of a steel scale, which is inserted and brazed into them, the work being done in such a manner that the wires are straight and parallel to each other. The sliding jaw, adjusting clamp and fixed head are each drilled and reamed to fit over the wires, the slots in the first two named pieces being made sufficiently wide to clear the scale, so that little wear takes place, and the bearing when the sliding heads are clamped is confined to the wires. All abrasion of the scale it thus prevented, and the character of the bearing is such that there is the minimum tendency to throw the jaw out of square with the beam, as the result of wear. At the same time the form of the beam gives the greatest rigidity and strength with a given weight. The jaws are hardened and accurately ground, and it is the intention to make some of the tools with a micrometer head on the adjusting screw, by which the sliding jaw can be moved by thousandths of inches.

Milwaukee, Wis.—The Edison-Villard Illuminating Company, of Milwaukee; capital, $500,000; incorporators, David M. Benjamin, Frederick N. Finney, and Frank G. Bigelow.



BILLINGS' NEW STYLE BEAM CALIPER.

St. Louis, Mo.—Articles of incorporation of the East St. Louis and St. Louis Electric Railway Company have been filed in the office of the Secretary of State at Springfield. It is proposed to construct a railway from a point on the Illinois and St. Louis bridge where it is intersected by the boundary line between the States of Illinois and Missouri; thence easterly to and through the city of East St. Louis; thence to the National Stock Yards in St. Clair County, in the State of Illinois, the line to end at some eligible and convenient point in said county. The capital stock is $100,000 and the principal office is located at East St. Louis. The incorporators and first board of directors are C. C. Carroll, Henry C. Latham, S. G. Barton, D. R. Powell and E. C. Lackland.

Allegheny, Pa.—The Brilliant Electric Light Company, of Allegheny City. The incorporators are R. T. McDonald, of Fort Wayne; A. H. Heisey, Willis F. McCook, Eugene Ingold, A. E. Townsend and James C. Miller, of Pittsburgh and Allegheny. The character and object of the new company is the supply of light, heat and power or any of them by electricity to the public in Allegheny City. The company is composed of the principal stockholders of the old Fort Wayne Electric Company, and is being organized for the purpose of making bids for the lighting of the streets, parks and public buildings of Allegheny City. Bids were completed by Eugene Ingold, one of the incorporators and a member of the Pittsburgh Electric Company, and will be presented by the new company in a day or so. Their principal competitor is the Westinghouse Electric Company.

Columbus, O.—The following articles of incorporation were filed in the office of the Secretary of State: The Citizens' Electric Light and Power Company, Van Wert, capital stock $20,000; the American Foundry and Machine Company, Bowling Green, capital stock $20,000.

Cheney, W. T.—The Cheney Electric Light, Telephone and Power Company, to be located at Cheney; capital stock, $100,000. This corporation was organized for the purpose of erecting and operating an electric light plant at Cheney. The officers are W. F. McQuevey, president; Fred. Pohler, secretary; J. A. Harris, treasurer; W. F. McQuevey, D. H. Fisk, J. A. Harris, G. Fellows and Fred. Pohler, trustees.

Kansas City, Mo.—The Hatch lock has been patented, and a company with $3,000,000 stock has been formed in Kansas City and New York to place the patent. The invention is an apparatus to be used in telegraphy, by means of which all connections with a telegraph wire can be cut off at all intermediate points between the sender and receiver. The patent is equally applicable to the telephone wires and their connections.

Denver, Col.—Articles of incorporation of the Carpenter Electric and Storage Company, with a capital stock of $2,500,000, were filed with the Secretary of State. Their principal office will be in Denver; they will engage in manufacturing and supplying electric light and machinery. The directors of the company are H. H. Carpenter, of New York, Edward Eddy, W. H. James, Dennis Sullivan, J. B. Grant, W. A. Johnston and Lewis A. Kent, of Denver.

Dubuque, Iowa.—Milwaukee and Lake Superior Telegraph Company, with headquarters in Milwaukee; capital stock, $100,000; object, to construct a line from Chicago to Lake Superior; incorporators, Charles H. Clason, Jeremiah Quinn and E. A. Benson.

Pittsburg, Kan.—The Pittsburg Electric Light and Railway Company has accepted the franchise granted by the city council. The franchise provides for the completion and operation of three miles of road by January 1, 1890. New York and Philadelphia capitalists are promoting the enterprise.

Portland, Me.—The Wilson Incandescent Lamp Company has been organized at Portland, with a capital stock of $800,000; paid in, nothing; par value of shares, $10. President, Jeremiah Prescott, Arlington, Mass.; treasurer, Charles M. Reed, Boston, Mass.; directors, Jeremiah Prescott, Charles H. Brown, Charles L. Cotton, Russell C. Elliott, Charles M. Reed, George W. Wilson and James F. Cook. Business to be prosecuted, manufacturing and selling electric lamps and other electric appliances.

Fort Wayne, Ind.—Articles of incorporation were filed August 7 with County Recorder Thompson for the Fort Wayne Electric Company, which will manufacture electric machines and appliances. The capital stock is $3,000,000, to be divided into shares of $25 each. The business of the company will be managed by five directors and the following gentlemen will serve the first year: J. H. Bass, H. G. Olds, P. A. Randall, R. T. McDonald, all of Fort Wayne, and M. W. Simons, of Plymouth.

Dubois, Pa.—Dubois Electric Light, Power and Heat Company, of Dubois; capital, $25,000.

Chicago, Ill.—Duplex Electric Gas Motor Company, Edwardsville; to manufacture steam, gas and electric engines and appliances; capital, $1,000,000; incorporators, Jay Noble, F. A. Diergin, J. A. Gumersella, A. P. Wolf, J. H. French and W. Halleck Jones.

Baltimore, Md.—Endowment Division of the Order of the "American Fraternal Circle," of Baltimore city, has been incorporated by John W. H. Fry, John D. Cook, Charles W. S. Banks, Wm. A. Kahn, Bernhard Myer and Wm. U. Day. The object is to have lectures, read essays and discuss new inventions, encourage research in art, science and literature. It has no capital stock.

Portland, Ore.—The Portland and Puget Sound Railroad Company. The capital stock is fixed at $5,000,000, divided into 50,000 shares. The object of the corporation is to construct and equip a railroad and telegraph line from Portland to Seattle, W. T., with several branch lines. One of the branch lines is to extend to Gray's Harbor and the other to Port Townsend. Chester W. Collins and others, incorporators.

Philadelphia, Pa.—Articles of incorporation were filed in the Camden County Clerk's office by the Philadelphia Auxiliary Fire Alarm Company. The incorporators are L. A. Conwell, John C. McNaughton, and George G. Crosby, of Philadelphia, and W. H. Birkmire, of Beverly. The objects of the corporation are to supply and furnish houses and other buildings with fire alarms. The capital is $500,000, with $1,000 paid in.

Chicago, Ill.—American Graphite and Plumbago Manufacturing Company, Chicago; to mine and manufacture plumbago and graphites; capital, $100,000; incorporators, James F. McGrew, Lee H. Wilson, R. D. Coy.

Portland, Me.—The Wilson Incandescent Lamp Company has been organized at Portland, with a capital stock of $800,000; president, Jermiah Prescott, Arlington, Mass.; treasurer, Charles M. Reed, Boston, Mass.; directors, Jeremiah Prescott, Charles H. Brown, Charles L. Cotton, Russell C. Elliott, Charles M. Reed, George W. Wilson, and James F. Cook.

Grant's Pass, Ore.—The Grant's Pass Water, Light and Power Company, with a capital stock of $30,000; the incorporators are J. W. Howard, J. A. Jennings, J. L. Scott, Arthur Conklin, Charles K. Chausler, F. M. Johnson and W. T. Coburn. The object is to supply the city with water and an arc light system, and also to furnish electric power for manufacturing purposes. A majority of the stock has already been subscribed.

Wheeling, W. Va.—The Tygart's Valley Telephone Company; purposes, constructing and operating telephone lines along the turnpike road from the town of Belington, Barbour county, to Mingo Flats, Randolph county. The privilege of increasing the stock to $10,000 each is reserved. Shares, $20 each; B. L. Butcher, J. L. Wamsley, S. A. Rowan, C. H. Scott, Omar Conrad and Geo. M. Leonard, all of Beverly, Randolph county, directors.

Wheeling, W. Va.—Tygart's Valley Telephone Company; capital stock, $10,000.

Bay City, Mich.—Bay County Electric Light Company; capital stock, $50,000.

Detroit, Mich.—Michigan Phonograph Battery Company; capital stock, $25,000.

Decatur, Ill.—A certificate was filed for the consolidation of the Citizens Street Railway Company of Decatur with the Citizens Electric Street Railway Company.

Chicago, Ill.—Consolidated Electric Company, Chicago; to do general electric business; capital, $100,000; incorporators, H. G. Smiley, W. A. Gordon, W. J. Thompson.

Chicago, Ill.—Auxiliary Fire Protective Company, Chicago; to place in buildings a system of electric fire alarms; capital, $600,000; incorporators, Rollin M. Squire, U. W. Weston, James G. Hoyt.

Lansing, Mich.—Bay County Electric Light Company, Bay City, West Bay City and Essexville; capital stock, $50,000. Michigan Phonograph Battery Company, Detroit; capital stock, $25,000.

Springfield, Ill.—The Secretary of State issued a license to the Havana Electric Light, Heat and Power Company, Havana, to supply light and power; capital, $15,000; incorporators, V. P. Turner, D. B. Thorp, Newton C. King.

Milwaukee, Wis.—The Chicago, Milwaukee and Lake Superior Telegraph Company, with principal office at Milwaukee; capital, $100,000; incorporators, Charles L. Clason, Jeremiah Quinn, and Edward B. Benson; object, the building and operating of telegraph lines.

Edwardsville, Ill.—Duplex Electric Gas Motor Company, Edwardsville; to manufacture steam, gas and electric engines and appliances; capital, $1,000,000; incoporators, Jay Noble, F. A. Diergin, J. A. Gumersella, A. P. Wolf, J. H. French and W. Halleck Jones.

Holbrook, Mass.—A franchise has been granted by the board of selectmen to the Randolph & Holbrook Electric Light, Power and Gas Company, with the right to establish a plant, erect poles and string wires within the limits of the town. The plant must be built within six months.

Rochester, Pa.—The Street Railway Company of Rochester, Pa., recently increased their capital stock to $50,000, which was mostly taken. It is proposed to extend the road $3\frac{7}{8}$ miles, running through Rochester, West Bridgeport, Beaver and Van Port. The road will be operated by electricity.

Detroit, Mich.—The Fisher Electric Company, with a capital stock of $50,000, of which $5,000 is paid in. The company is organized for the manufacture and sale of all kinds of electrical machinery and appliances. Frank E. Fisher holds 2,510 shares, S. R. Mumford 50, Frank E. Fisher, trustee, 2,190, C. H. Meday 50, and Hiram Marks, 200.

St. Louis, Mo.—Articles increasing the capital stock of the Mound City Street Railway Company from $125,000 to $1,000,000 were filed in the recorder's office. The assets of the company are given at $300,000, and liabilities $126,000. Articles increasing the capital stock of the Union Depot Railway Company from $400,000 to $1,200,000 were also filed. The assets of the latter company are given at $811,000, and liabilities at $351,000. The object of the increase of the capital stock of the two companies is to raise money to change the motive power of the lines named to electricity with overhanging wires.

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☞ No attention will be paid to communications without the *name and address of the writer.*

We invite correspondence from Electricians, Inventors, and the Telegraph and Telephone fraternity and those engaged in Electric Lighting, on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

Subscribers can at any time have the mailing address of their paper changed by sending both old and new address

NEW YORK, AUG. 31, 1889.

CONTENTS.

	PAGE.
New Station at Springfield	1
The Various Uses of Electricity	1
Rowland on the Velocity of Electricity	1
Pittsburgh's New Electric Road	1
A Magnetic Plant	1
Electric Power on the Rhine	1
The Kapp Alternator	1
The Zell Improved Safety Boiler	2
Some Additional Exhibits at the Niagara Falls Convention	2
A Promising Western Company	2
Billings' New Style Beam Caliper	3
New Corporations	3
The King of Spain and the Exposition	4
A Kind Word	4
The Protection of Telephone and Telegraph Instruments	4
Electrical News:	
Our Chicago Letter	4
Our Boston Letter	5
Our Washington Letter	5
President Weeks's Knowledge of Cushing Criticised	5
That Old Timer, the "Man up a Tree," Has a Few Words to Say	5
Personal	5
A Name for Death by Electricity	5
Telephonic News	6
Long Distance Telephoning.—Electric Cars	6
"Electrical Transmission of Power"	6
Telegraphic	7
Electric Power	8
Should the Duty on Copper be Abolished?	8
A New Incandescent System—The Loomis Incandescent System	9
A New Arc Lamp	9
A Far-Sight Machine	9
Electric Light News	9
Kindred Interests	10
Palmer's Electric Signal Box	10
Electrical Patents	10

The general superintendent of the Long Distance Telephone Company was detained in New Bedford, Mass. Calling up his stenographer in New York, all his letters were read to him and he dictated replies, and the accumulation of correspondence was soon disposed of. The telephone is a great invention, and its wonders and benefits continually grow.

The Bell telephone instrument account is worthy of note that the increase of telephones in use is less rapid than last year. Still, the decline is only 64 for the month to August 20th, and an average of about 70 per month since December 20th, the beginning of the year for this account.

Month Aug. 20.	1889.	1888.	Increase.
Gross output..	4,302	3,694	608
Returned.....	2,471	1,799	672
Net output..	1,831	1,895	*64
Since Dec. 20..	1888-9.	1887-8.	
Gross output..	38,640	37,740	900
Returned.....	16,142	14,685	1,457
Net output..	22,498	23,055	*557

*Decrease.

To the Great West: Look out for the telephonists in September.

The Electric Club will begin its season of lectures and meetings in October. A particularly interesting and instructive series of meetings may be expected.

There was an interesting exposé of one Harold P. Brown in the New York *Sun* last Sunday. If that young man is heard from again in the electrical field we miss our guess.

To the members of the National Electric Light Association who are about sending in their resignations we say, "don't." The wrong action of its officers are mere incidents of the present—the Association should be for all time.

The REVIEW published a very full report of the Edison Convention in its last issue. We think this was probably the most important of any of the meetings of this association, and the papers, of which we presented a summary, of the highest quality. There is no lack of ability in the electrical field, nor of energy either.

The communication from "Central Station" may enable Mr. Weeks to see the light in which he appears, even to his best friends. There was a manly way for him to get out of his humiliating position, but if he persists in his written opinion that what he did at Niagara Falls was "strictly legal and just," he becomes unworthy of further confidence.

We do not remember to have seen a finer bit of humor than that in a recent *Sun* editorial, which said that Harold P. Brown, in his secret chamber trying to kill Kemmler by electricity, would first, no doubt, test the criminal's resistance by means of "a Westinghouse brake!" Judging from the present state of young Brown's mind the *Sun's* intimation that he will use everything possible bearing the name of Westinghouse is a fine bit of wit that the electrical fraternity will thoroughly appreciate.

Two of the World's Fair committees have organized. The *Tribune* remarks that "the labors of the finance committee may be more multitudinous and varied than those of the committee on site and buildings, but they are no more important, and certainly not more onerous. It is too much to suppose that the decision of the committee will satisfy everybody, but there will be no questioning its freedom from selfishness." The REVIEW thinks the committee is to be congratulated on starting into the work with an accomplished and tactful editor as chairman. Mr. Chas. A. Dana, of the *Sun*, is a most happy selection.

THE KING OF SPAIN AND THE EXPOSITION.

Queen Isabella, of Spain, pawned her jewels in order that Columbus might have money to fit out his expedition in search of a shorter route to India, and it resulted in the discovery of America and in naming the aborigines Indians. Columbus thought he had reached India.

In the coming celebration of this event at New York by the holding of a World's Fair, Spain should have a place of honor. How appropriate it would be to have a squadron of Spanish and American men-of-war set sail from the port from which Columbus took his departure in 1492, and after visiting San Salvador to proceed to New York there to take part in a grand naval display of all nations which would be the culmination of the series of celebrations! While owing to his tender years it could not be expected that the King of Spain would be present, it is still possible for him to take an active part by actually opening the Exposition. It is easily within the reach of electrical science, in these days of ocean telegraphy and siphon recorders, to so arrange a circuit in connection with the Atlantic cable that, without leaving his palace, the infant successor of Ferdinand and Isabella could set in motion the ponderous machinery of the exposition, and bring light to the myriads of electric lamps which will illuminate the assembled wonders of the world.

Surely nothing could be more sublime, or more strikingly illustrate the progress that has been made since the days when it was thought that the earth was flat.

A KIND WORD.

The REVIEW has received many letters and, in some instances, telegrams of commendation during the past two weeks. We trust our readers will pardon our publishing the following extract from a letter which came from a gentleman engaged in electric lighting in one of the Eastern States: "Permit me to congratulate you most heartily and sincerely upon the excellent issues of the REVIEW covering the meeting of the National Electric Light Association. It affords me pleasure to note the continued improvement in the REVIEW, and while each issue is best, still it seems as though each following one was better, and you may safely be said to stand so far ahead in your particular field that you have no rivals. I express this sentiment with all the more confidence from the fact that on every hand the universal testimony confirms me in the statement."

THE PROTECTION OF TELEPHONE AND TELEGRAPH INSTRUMENTS.

There are few matters of greater importance to the telephone and telegraph companies than the protection of their instruments from damage by currents from electric light and power wires, and there is no problem presenting such a diversity of opinion as to its solution. To protect instruments against heavy currents it is necessary to place in the line before it reaches the instrument to be protected a safety device of some kind. Upon this point all are agreed, but it is in determining of what this protector shall consist that the difficulty appears. Fusible metallic strips, such as are employed in electric lighting, were naturally first thought of and are now largely used. A great amount of careful investigation has been conducted in regard to the behavior of fusible metals, and there is no doubt that when properly constructed they will keep out dangerous electric light currents; but when made sufficiently delicate for this purpose they become so abnormally sensitive that they are a serious defect in any system which they form a part. They are frequently melted by atmospheric electricity which would otherwise be harmless, and a severe lightning storm will seriously cripple all lines in which they are located. Such an evil have they become, that those by whom they have been extensively adopted are about convinced that the cure is as bad as the disease, and are anxiously looking for a substitute.

To demonstrate the value of their protectors, inventors often apply the heaviest currents obtainable, supposing that such currents form the severest test. This is not the case, however, for paradoxical as it may seem, it is the comparatively feeble current, just weak enough to pass the protector, that is the most difficult to control. The heat from such currents stored in the convolutions of a relay or annunciator magnet soon becomes sufficient to destroy it.

Automatic electro-magnetic devices restoring the line to its normal condition after the disappearance of the dangerous current are now being put forward. Such devices are objected to on account of the well-known retarding effect on the telephone current which is caused by the introduction of electro-magnets in circuit; and also because they involve the use of a rather delicate contact. Where they are used in metallic circuits we think the retardation might be overcome by putting one coil in each side of the circuit and by winding both coils in the same direction and mounting them on the same core. The use of the contact cannot be avoided, but as large numbers of these automatic devices are being tested in a practical way by one of our large telephone companies, we shall soon know how great an evil these contacts really are. We have no doubt that much valuable data will be forthcoming on this subject at the coming Telephone Convention.

The Long Distance Telephone Company has recently completed an arrangement with the Chicago Telephone Company, whereby the former's metallic circuit is to be used by the subscribers of the latter wherever the former has connection.

ELECTRICAL NEWS.

Boston, Chicago and Other Points.

OUR CHICAGO LETTER.

A Fine Point.—The treasury department at Washington is in a fix. Solicitor Hepburn has been asked to decide the question of whether electricity is a dutiable article. On the Canadian side of Niagara a company has been formed and a plant established, with the intention of running electricity to Buffalo for illuminating purposes, and what the company wants to know is, whether it can cross the line regardless of tide waiters and revenue cutters.

More Testimony.—At Steubenville, O., on the 8th instant, the superintendent of the electric railway at that point, Mr. A. G. Davids, played the buzz-saw act, and is ready now to be placed on the witness stand.

The Steubenville railway is of the Sprague motor variety, and the current used is of 900 volts constant potential.

The trolley wire broke on the day in question, and Mr. Davids undertook to repair damages by the use of insulated tools. With some difficulty and a pair of dull pliers he succeeded in cutting the wire and being suddenly stretched unconscious on the ground in "one time and two motions," as a body might say.

Mr. Davids retains a vivid recollection of the shock, which he compares to a blow struck on the breast with a club, but says that while the pain was intense for the instant, it lasted so short a time that it was gone before he realized what had been done.

Other employés of the railway have been shocked, but in a milder way, and describe the sensation produced as being something like sea-sickness.

Electricity and Vetoes.—The Council at Buffalo has quite a squabble now and again on the subject of electric lights in the streets. The people want more light, and the Mayor vetoes the propositions. At a recent meeting the vetoes of the Mayor were overruled by the Aldermen in 23 instances, by votes ranging from 18 or 19 ayes to five or six nays, each particular case being taken separately.

Electrocution.—The hopes of the electrocution party are now blasted forever. When the poets get after a hobby they either ride it into or out of public favor at will. Just now, the poet who does the wheel and gimlet rhymes for an Ironton paper has sent a thrill through the brains of all the Ohio electricians by the crystallized knowledge and scientific vim which he has condensed into a poem. The poem is too rich for mere rhyme. I give part of it in prose—so few of the REVIEW readers would thoroughly appreciate it in an alternate meter. The first verse describes most graphically the preparation and the shock:

1. They placed the form of the murderer upon the electric rack, and fired 1,700 volts into his naked back!

2. He quivered an awful moment, then quietly raised his head, and asked that his friends might take the corpus of the dead.

3. But the cruel executioner again discharged the bolts—at least a score or two of ohms, and full 3,000 volts.

4. "Now this is simply shocking," the murderer did say. "Go get a rope and let me die in the good old fashioned way."

Sharp Practice.—At the corner of Thirty-third and State streets there is a wooden horse circus for children and ladies where, for five cents, one goes galloping round on a whirligig very many times, to the brassy music of an orchestrion. Thursday night, when the 80 animals were all loaded up with ladies and people, three darkies who had well studied the surroundings, switched off the electric lights preparatory to a raid on the pocket-books of the equestriennes. The proprietor shouted "look out for your pockets," and everybody else shouted "police," save the darkies, whose rallying cry was "swipes." The light was switched on again just as a couple of stars rushed in, and the highwaymen were carried away. The switch will be locked hereafter

The Electrical Supply Company is in the field with a new wire, an improvement on the P. & B., which has been christened the "Shield" wire. The shield wire will rank very much higher than the cheap objectionable wires of the past, and has some qualities which do not obtain in some of the more expensive grades of wire. The same establishment is wholesale agent for all of the Fletcher specialties, all of which leads to higher insulation.

The World's Fair.—The first meeting of the electrical people *in re* the World's Fair, was held in the open court of the Western Electric Company on the 20th. Six hundred employés and officers of the establishment attended. The following resolutions were unanimously adopted:

Resolved, That we heartily approve of the effort now being made in every branch of business to secure the World's Exposition in 1892 in Chicago.

Resolved, That, in our judgment, to secure the end desired will require the hearty co-operation of every man in Chicago.

Resolved, That as employés of the Western Electric Company we pledge to the finance committee our full proportion of subscriptions to the capital stock and recommend that every interest be promptly organized.

Pursuant to a call from the committee appointed by the Mayor, consisting of B. E. Sunny, C. H. Wilson and E. M. Barton, a meeting was held at the Electric Club rooms on the 22d, at which there was a large attendance. Mr. Sunny was chosen chairman.

Mr. Kreidler offered the following, which was unanimously adopted:

Resolved, That we, as representatives of electrical industries, heartily endorse the project of holding the World's Exposition of 1892 in the city of Chicago, and that we will render our proportionate aid in the undertaking, financially and otherwise.

Sub-committees were appointed as follows:

Central station companies, of Cook County—C. H. Wilmerding, F. S. Gorton, D. P. Perry, Haskins.

Electrical journals—Kreidler, De Land, Haskins.

Merchandise companies — Terry, McKinlock, C. D. Crandall.

Telephone companies—F. G. Beach, H. B. Payne, of Milwaukee, Herman Drake, of Nebraska.

Wire Companies—Fred. E. Degenhardt, Jno. Cutter, Geo. C. Bailey.

Motor companies—C. M. Barclay, A. H. Lewis, G. B. Bailey.

Miscellaneous Manufacturing—Sperry, M. A. Knapp, Forde Bain.

Legal fraternity—Wm. Zimmerman, E. C. Ferguson, F. W. Parker.

The electricians will raise between $200,000 and $300,000 for the purpose.

C. C. H.

Chicago, Aug. 24, 1889.

OUR BOSTON LETTER.

An Hour to Malden.—The West End Railway Company is making arrangements to have the Malden Electric Light Company furnish the power for running electric cars between Boston and Malden. It is thought that this line will be in operation within a year.

Newton Electric Railway.—Work will be commenced immediately on the electric road running through Newton, Waltham and Watertown. At a recent meeting of the stockholders, Mr. George W. Morse was elected president of the company, and Mr. F. G. L. Henderson was elected superintendent of the road. The money has been paid in on the stock and everything will be done to push the work as rapidly as possible. The line connecting with the West End tracks at Galen street, Newton, and running through Washington street to West Newton, will be completed at once. The locations in the places named have been granted, and the delay in building the road has been occasioned by the company not being able to get steel chairs to lay the rails on. The gentlemen interested in the road are among the most active and prominent business men in Newton, and everything will be done to render the equipment and service first class in every particular.

The Portelectric. — The New England Portelectric Company have on exhibition at the Old South Church a one-third size model of their invention for carrying mail matter and parcels. Several thousand people have witnessed the working of the model, and the project has so gained the confidence of the public that enough stock has been purchased to warrant the directors in building a line in the vicinity of Boston. J. T. Williams, the inventor, and Prof. Dolbear, the electrician, together with the directors, have selected a site in Dorchester for the location of this line. The track is to be one mile in length and elliptical in form. The location selected embraces all conditions of grades and curves likely to be encountered in running a line for practical use. The success of this experimental road will, no doubt, insure the success of the Portelectric on a larger and more practical scale. A competent civil engineer of this city has the contract for building the road and it is to be completed before October 1st. The company will manufacture its own power and will make a public exhibition of its line at the earliest practicable moment.

More Cars and Faster Time.—The West End Company intends to re-lay its 150 miles of track with heavy rails. The work was delayed on account of the Johnstown floods, as the rails to be used are made only at the Cambria Iron Works. It is understood that the running time is to be reduced one half, thereby doubling the carrying capacity. As soon as the Harvard bridge is opened it is expected that 200 more cars will be needed. In laying the new tracks a Thomson-Houston electric welding machine will be run, and the rails will be welded into lengths of 300 feet. This will, no doubt, give a track of great smoothness, and will be an innovation in track construction.

Telephone Conduits.—The Bell Telephone Company are engaged in laying conduits for their city circuits connecting with long distance lines. The conduits for the Boston terminals of the Hartford and Providence lines are now being laid, and the work is being done in a very thorough manner. The group of tubes forming the conduits is virtually encased in a block of cement 17 inches square.

Proposed Electric Road.—Major C. F. Woodward, of Wakefield, and G. F. Butterfield, of Stoneham, are working on a project for an electric street railroad to run from Wakefield to the Wyoming station on the Boston & Maine Railroad. It is expected that the proposed railway will pass through Stoneham Centre.

S. L. C.

Boston, Aug. 26, 1889.

OUR WASHINGTON LETTER.

Electric Motors.—Here is a city where the electric motor is appreciated. Numbers of stores, restaurants, etc., have fans run by various kinds of electric motors. One or two printing offices use them to run their presses. Close upon the heels of the contemplated trials of the electric motor by the Brightwood R. R. Company comes the announcement that the Georgetown and Tenallytown R. R. Company have closed a contract with the Thomson-Houston Company, of Boston, for a complete apparatus.

New Contracts for Lighting.—The Pittsburgh Electric Heat and Power Company have undertaken a large task. Several days ago the commissioners signed a contract with this company for lighting certain streets. Incandescent lights will be used. The difficulties in the way are immense. The wires will, of course, have to be laid underground, as there is a well-enforced law in the District which prohibits the erection of overhead wires. The expense of this will in itself be enormous. Their contract calls for light at one-third the cost of gas. With gas as cheap as the cheapest and two powerful companies to compete against, truly the way is hard. But the end is not yet. It is stated that the gas company will attempt to obtain an injunction restraining the new company from tearing up the street. That the electric light will be ultimately successful there is no doubt, but from present indications there is a long up-hill fight before it.

GENERAL NOTES.

The Brush Electric Company, of Cleveland, Ohio, were the successful bidders for installing an electric light plant at the Washington Navy Yard.

Ever since Solomon put lightning rods on the temple, man has been striving at the progress and perfection of electrical science. The Municipal Signal Company, of Boston, have about reached the summit of the mountain in their line of business. Judging from the perfection of the exhibit of police alarm and signaling apparatus that they have sent here, their system is destined for a brilliant and prosperous future. Every contingency is provided for. The signals that do not require immediate attention come in inaudibly, and are registered on tape and each stamped with the time of receipt. Wagon and telephone calls ring a bell. The box number is immediately sent to the stable by a new form of transmitter recently patented, and the property of this company. Should the Lieutenant desire to communicate with the policeman upon his next report, he depresses a switch, and when the policeman reports a bell in the transmitter box rings and notifies the policeman that he is wanted at the office. Then by moving the pointer to the telephone call and pulling down the hook, he rings a bell at the station and is placed in communication with the Lieutenant. There is also upon the desk a fine testing set, together with relays and switches for various purposes.

The Brightwood R. R. Co. have been contemplating using some other motive power than horses on their projected railway, and have arranged, through one of their officers, Capt. A. A. Thomas, for a trial of the electric motor on their lines. Their preference seems to be for the storage battery system, and a representative of the Julien Company will be here this week to look over the ground. A trial trip will be made upon the completion of the line on or about the first week in September. They will obtain their power from the city circuits of the U. S. Electric Lighting Company. The contract for the plant at the Navy Yard has been awarded to the Brush Company. The specifications call for four direct current dynamos of approved pattern and two 10½x12 Armington & Sims engines, or their equivalent. Each dynamo must be capable of operating thirty 2,000 candle-power arc lamps continuously, and upon full load must not heat more than 70° F. above the temperature of the surrounding atmosphere. There will be four circuits, one for outside lighting and three for the shops. The wires will be strung overhead and well protected by efficient lightning arresters. Switchboards, volt and ammeters, tachometers and the usual appurtenances of a well equipped station are specified and called for. The government requires the contractor to give bond in the sum of $2,000 for the faithful performance of the contract. No payments will be made until the plant has been tested and accepted.

G. E. M.

Washington, D. C., Aug. 16, 1889.

President Weeks's Knowledge of Cushing Criticised.

To the Editor of Electrical Review:

President E. R. Weeks, in his communication in your issue of August 24th, is unfortunate in his reference to Cushing's Manual. One of the first principles enunciated by Cushing in governing the decisions of the chair in any deliberative body, is that one of the functions of the office is that of judge. This necessarily makes him responsible for the manner and form in which matters are placed before the body. Cushing plainly sets forth that it is the duty of the presiding officer, when an inexperienced member puts a motion in a form which is unintelligible, or which is likely to be misleading, to assist the mover by making such suggestions as to put the motion in proper form. It is also his duty to suggest to the body the effect of any pending motion, and this is especially the case when presiding over a body who have not been confined strictly to parliamentary usages. Mr. Weeks says in his communication that the mover of the motion stated he used the word "accept" understandingly; it was very evident that the body of the house did not so understand the motion, and it was the imperative duty of the chair at this point to explain the effect of the motion before putting the same, and it was equally the duty of the chair when attention was called by the numerous inquiries made immediately after the motion had been adopted, to have frankly stated to the body that there being an evident misunderstanding on the adoption of this motion, the chair would now entertain a motion to reconsider.

Had a spirit of fairness of this character been shown by the chairman, he would not now be resting under the imputations of being a party to hasty and ill-considered actions. His whole letter is a series of special pleading which does not commend itself favorably to fair-minded men.

The persistency with which the chair ruled out all questions bearing on this point is evidence of the intention of the chair to push the report of the committee through. One of the first duties of a presiding officer is to enforce the rules governing it. Mr. Weeks admits (that while he was familiar with Cushing and stands upon Cushing as his justification) he overlooked the provision of the constitution requiring a two-thirds vote to adopt an amendment. It is a grave question whether the adoption of any report can alter the organic law governing the body. Altogether, Mr. Weeks presents a sorry spectacle of a small man in a large hole.

Central Station.

New York, Aug. 24th, 1889.

That Old-Timer, the "Man Up a Tree," Has a Few Words to Say.

To the Editor of Electrical Review:

The action at the close of the Convention has a very curious hue when viewed from the summit of a tree. In talking the matter over with some of the ex-communicated there seems to be a possibility of a very considerable shrinkage in the attendance as well as in the membership.

Taxation without representation was what our forefathers fought against and won. In this case the principle has to be maintained by staying at home.

There are certain of the supply men who are willing to be taxed for attending conventions, for they look upon it as so much added to the expense of a business trip twice a year, to where a large number of customers may be seen at one time, and business enough transacted to pay off the extra score. The newspaper men may go, for it is to them a matter of interest. There is a still another class now relegated to back seats who will be very likely to say that taxation without representation is not for us. They are the experimental electricians, who have paid their money for membership, who have written up and brought to the annual and semi-annual meetings the results of those experiments and gladly given them for the benefit of all, without compensation. These are men whom the Association has sought and asked to assist with such information. They have materially aided, we have always been told, in making the meetings interesting, and been largely instrumental in keeping alive in all an interest in the Association and its work, and their only reward, aside from the glory achieved, has been that which was consequent upon an active membership.

It may not result as is here indicated—but it really does look to the aforesaid individual in the tree-top as if it were possible that the programme for the next meeting might possibly be a little difficult of accomplishment.

Chicago.

PERSONAL.

Mr. D. W. Baker, the large platinum importer and refiner of Newark, returned last week from an extended business trip through Russia, Austria, Germany and a visit of several weeks at Paris attending the Exposition.

Mr. Emil Boye, a young Swede, who has been studying electricity and business methods in America, has just sailed for his home in Gutenberg, where he will open an agency for the sale of electrical apparatus and supplies.

A. F. Adams, manager of the Erie Telephone Company, at Little Rock, Ark., is visiting in New York. Mr. Adams is the inventor of a telephone message recorder for toll lines, that will prove a valuable addition to telephone apparatus.

Mr. W. E. Huntington, well known in telegraph circles in this city, is succeeding finely with his messenger company in Buenos Ayres. A recent paper from that city compliments very highly the work of his company in giving fire alarms, and in aiding in the capture of burglars.

George T. Manson, of New York City, H. D. Stanley, of Bridgeport, Conn., left this city last week for the Paris Exposition. They were in Pittsburgh during the last three days for the purpose of making themselves acquainted with the progress made in the electric business during the last year. —*Pittsburgh Dispatch.*

A Name for Death by Electricity.

To the Editor of the Tribune:

Sir: Various suggestions have been made as to a name expressive of electrical execution; such, for instance, as dyna-morti, electro-morti, electro-cide, electro-lethe and others. These names to the common mind have a scientific sound, and the implication naturally follows that that to which they relate is in itself scientific, or has a basis in scientific reasoning. In plain English, when a man is choked, we say he has been "burked"; when his head is cut off by a knife, that he has been "guillotined." Now, it occurs to me that it would be better, in view of the fact that Mr. Brown's experiments are in no sense scientific, that we adopt as the designative term an English name, and say, that when a man has been executed by electricity, he has been "Browned." This name will be found most descriptive as telling the public not only how the man was killed, and the name of his executioner, but also the probable condition of his flesh where the current has struck it. Certainly no fault can be found with such an expressive designation.

George H. Benjamin.

New York, August 21, 1889.

Society abhors the hangman. A gentleman will take no part in a public execution. Electricians and physicians are men of considerable education and character as a rule, and they naturally desire better business than slaughtering criminals, even with the approval of the law.—*Post-Express.*

Another of the innumerable developments of electricity now made is that of the electric light in surgery. Spectacles (to be used in surgical operations) are lighted by means of a small electric lamp. The lamp is so arranged as to send a beam of cool light on the part to be examined; meanwhile, the rims of the spectacles exclude the outside light from the observer's eyes.

In commenting on electrical execution, London *Iron* says: "Every particle of the nervous tissue is polarized, and polarization causes each particle of matter to revolve on its axis, which means the stretching of the nerves out of all proportion, and consequently the most intense pain. But the great fault with execution by electricity is that it is almost impossible to ascertain just how strong a current will kill a man instantaneously and yet not be a barbarous mode of killing. If the current be but a few volts stronger than that required to instantly execute a certain person, the consequences would be terrible. It would disfigure the body beyond recognition, and would disintegrate every portion of the corpse. Should the current be just a trifle too weak to execute a person, it would throw him into a trance so deathlike that it is probable that the body would be buried alive."

Telephone News

⁂ The copper wire metallic circuit telephone connection between Grand Rapids, Mich., and Ionia is now in use, and will be at once extended to Lansing and possibly to Detroit.

⁂ The French government has notified every telephone company in the country that the government will take possession of the lines within 12 months. The service will then be furnished the public at cost.

⁂ Arrangements are now in operation at Hutchinson, Kan., to have the Bell telephone system in working order in four or five weeks. This, when completed, will connect Hutchinson with Wichita, Newton, Topeka and Kansas City.

⁂ Copeland's Classified Telephone Directory has just been issued, and is a valuable and convenient publication. All the telephone subscribers in New York are arranged under appropriate business heads, with full address and number. This list will be issued every four months by the Telephone Directory Publishing Company.

⁂ The "long distance" telephone lines of the American Telephone and Telegraph Company, between Milwaukee and Chicago, have been completed, and Charles E. Mosley, the special agent of the company, has issued invitations to a number of well-known business and professional gentlemen of Milwaukee to call and make a personal trial of the service.

⁂ The Domestic Telegraph and Telephone Company at a recent meeting, it is stated, decided to give a perpetual lease of its entire plant to the New York and New Jersey Company, the latter to assume the interest on the debt of the former company. The New York and New Jersey Company bought out the stock of the Domestic Company some two years ago, and have been operating the telephone business in this city ever since, and this transaction is simply a business transaction for the convenience of the New York Company. Mr. Samuel Klotz, who is a director in both companies, said to-day that the Domestic Company will retain their organization, and that it is the intention of the New York Company to get their wires underground here as soon as it can be done without loss to the company.

⁂ The operation of the long distance telephone system west of New York State was successfully inaugurated in Chicago last week, the South American Telephone and Telegraph Company (long distance telephone company) formally opening its lines between Chicago and Milwaukee. The tests made were of a character to illustrate the great improvements that have been made in the art of telephony, particularly the utilization of complete metallic circuits. Representatives of the press and a number of business men were among those who tested the lines and expressed themselves as being highly pleased with the results attained. A whisper could easily be heard between Chicago and Milwaukee over the metallic circuits. Tests were also made with ground circuit (single wire) lines of subscribers in Chicago and Milwaukee, connecting the ground circuits in each exchange with the metallic circuit lines between the exchanges. While the result of this connection was good, it was made evident that for successful long distance talking metallic circuits were necessary. The lines between Milwaukee and Chicago are the beginning of the work of the long distance company in the West, with the probability, from the favorable reception met with, an immediate extension to New York is contemplated, thereby uniting with the elaborate system in the East.

Long Distance Telephoning.—Electric Cars.

TO THE EDITOR OF ELECTRICAL REVIEW:

I made some experiments here to-day with the long distance telephone, talking to Boston via New York. There was about 12 miles of cable in circuit. The "product" on this circuit is away above the limit at which Mr. Preece says it is impossible to transmit speech.

I could clearly hear from the operator at Boston the phrase "The ELECTRICAL REVIEW is the leading electrical journal." I was then connected with a residence in Cambridge, but could scarcely hear the voice of the speaker, but could easily tell when one of the Cambridge electric cars stopped for passengers. It seems strange that the running of the street cars in Cambridge, Mass., should interfere with the hearing of a man on the shore of Lake Erie. TELEPHONIST.

Buffalo, N. Y., Aug. 18, '89.

⁂ The Southern New England Telephone Company, of Hartford, Conn., have constructed a long distance telephone line to the military camp, at Niantic.

⁂ Samuel L. Allen, of Shrewsbury, Mass., is suing the New England Telegraph and Telephone Company, an action of tort, damages being placed at $15,000. The plaintiff, through his attorneys, Thayer & Rugg, alleges that on January 5, while he was traveling between his home and the city, in the exercise of due care, his carriage came in contact with one of the defendant's telegraph poles, throwing him out and breaking his leg. He alleged that the pole was placed too near the highway and without authority.

"Electrical Transmission of Power."

BY PROF. E. P. ROBERTS, BEFORE THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

It has been impossible for me to take the time necessary to redeem my promise, made a month ago to Mr. Garratt, and therefore I have no carefully digested paper upon the "Electrical Transmission of Power," but merely a few notes arranged from material obtained on Friday last, respecting the development of an interesting constant current dynamo and motor. When I stated to Mr. Brush that my paper for the Convention was not written, and requested permission to take some figures from the Brush constant current motor and dynamo then being rushed through the shop for exhibition at this Convention, he courteously acceded it. Upon last Friday morning the apparatus was hastily adjusted, and I was allowed some two hours to obtain such figures as might prove of interest. Although I consider the figures good, better could have been obtained if more time had permitted of closer adjustment of the motor governor, etc.

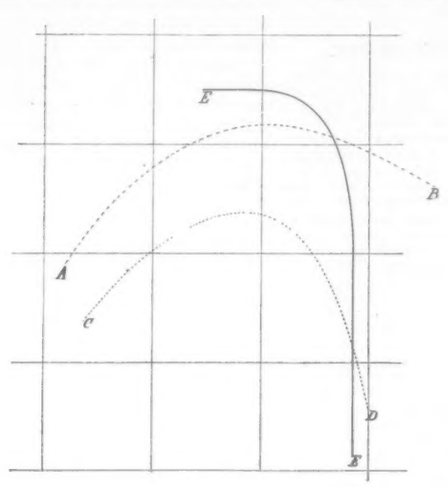


FIG. 1.

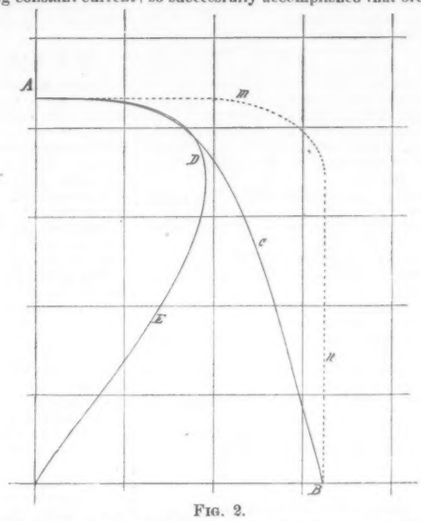


FIG. 2.

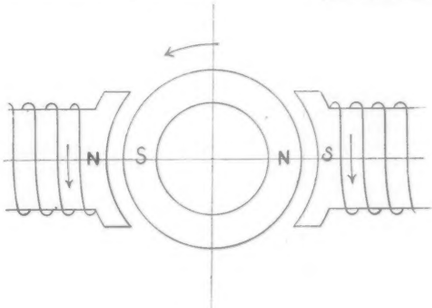


FIG. 3.

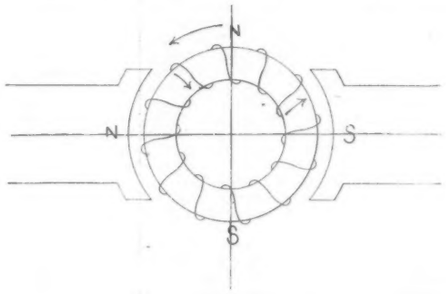


FIG. 4.

In order to interest you in the subject, allow me to briefly review the salient points of the largest installation yet erected of this type. The electrical papers gave last spring excellent descriptions of the electrical power plant on the Comstock lode, Virginia City, Nevada, where six 120 h.p. generators operate six 80-horse-power motors. You will remember that each generator drives one motor, that each generator is driven by a Pelton water wheel placed upon the shaft of the dynamo, that the wheels are actuated by water falling 1,680 feet, giving a pressure of 700 pounds to the square inch. Each wheel is controlled by a governor designed by Mr. W. B. Devereaux and his brother, Mr. J. H. Devereaux, of Aspen, Colorado. Mr. J. E. Smith adjusted the governor at the mines. The generators run at 900 revolutions, all are independently driven, as before stated, and the motors turn 850 revolutions per minute, and all drive to the same shaft. An interesting feature is that to this same shaft is geared a surface water wheel, and the water which actuates it, after passing it, drops one-third of a mile, and in losing the potential energy it had at the power house is develops dynamic energy by two transformations back at the same point and adds it to the small amount of dynamic energy it there developed.

The working out of the electrical mechanism to accomplish the above result is of great interest, particularly when we find it so successfully accomplished that orders are being given for similar apparatus for other mines, as well as for electrical railroad work and manufactories. A case of poetical justice has occurred in this line. The large Calumet and Hecla mines being about to erect five of these motors to assist in the production of copper, and thus electricity will assist to mine its chief servant—copper—as well as, in many cases, to refine it.

The generator will produce a practically constant current of 40 amperes from full load to a short circuit. As factors to produce this result are used compound winding and armature reaction. This introduces as variables in the design series ampere turns, shunt ampere turns, dimensions of armature, shape of pole pieces and length of cut-out segments. Changing any one of these produces a change not only directly due to itself, but also dependent upon the mutual interaction of these numerous factors.

Let us touch upon the subject of compound winding. Most machines have to be either long or short shunt, but the Brush machine can be intermediate between these if desired,

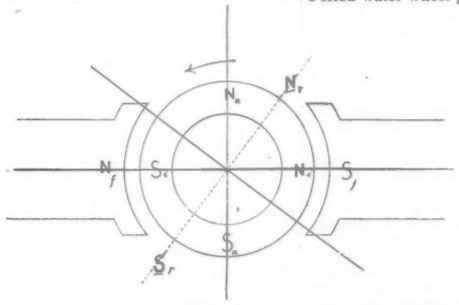


FIG. 5.

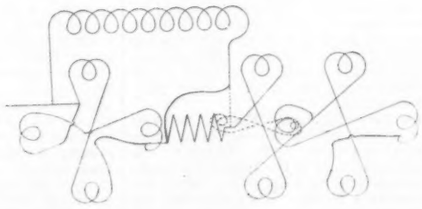


FIG. 6.

because the action of the armature is the same as if three armatures were revolving connected in series, and we can introduce one series coil anywhere in the circuit, and, therefore, make the shunt a "bye pass" to the external resistance and armature, or, in the case of a 12-coil machine, to the external resistance plus one-third or two-thirds or all the armature, or we can make a short shunt and cut it down to one-third or two-thirds the armature.

The compound winding thus possible is evidently very flexible.

The characteristic desired is as shown in Fig. 1 at *E F*, and the straight portion will be the working part of the curve. If the machine were of the ordinary type of Gramme ring with small armature magnetism, the curve would be *A B*, and if armature reaction were powerful it would tend to be as shown in *C D*. The reason for this is considered later. If the Brush dynamo be separately excited, the characteristic is like *A C B* in Fig. 2. If a shunt winding is used, the characteristic is of the type *D E F*. The combination of these elements must be used

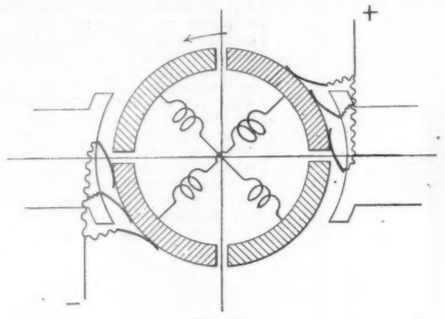


FIG. 7.

to produce the dotted line *M N*. These curves are modified by the dimension of the iron and the copper in the armature, and this point can be advantageously dwelt upon for a moment. The magnetic axis due to the field magnets is, as shown in Fig. 3, that due to the armature, as shown in Fig. 4, and that of their resultant is shown in Fig. 5. The line of collection being at right angles to the commutator line in the apparatus being considered as an open coil armature is used. The stronger the magnetism due to the armature the greater the distortion of the field, and the weaker it becomes. With a constant current through the system it might

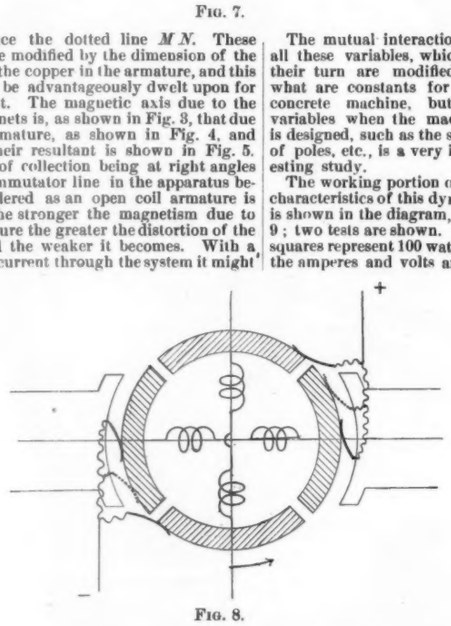


FIG. 8.

seem as if no variation in armature reaction were possible. By examination of Fig. 6 we find that although a constant current flows in the outside circuit it varies in the shunt according to the external resistance, and in such portion of the armature as is shunted. If the shunt is a long shunt, or partially on the series, winding will also be affected. As a segment arrives at the back brush, see Fig. 7, the bobbin connected thereto is approaching the maximum field, and when it reaches the forward brush both brushes take current from the segment. When the breaking space arrives between the two

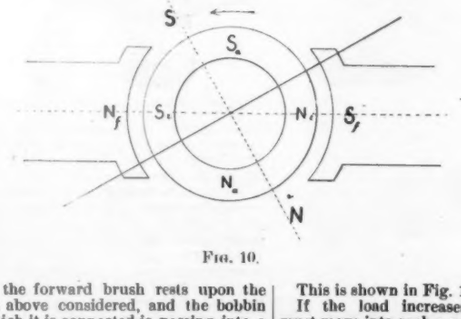


FIG. 10.

brushes the forward brush rests upon the segment above considered, and the bobbin with which it is connected is passing into a weaker field. We have, however, a self-induced current in the bobbin, which desires to discharge itself and takes time so to do—this current will be in the same direction as the armature current. At first, when one brush rests on each segment, the segments are at the same potential. Soon the self-induced current in the front brush has commenced to discharge, the field in which it is revolving having become weaker, and it is time to disconnect the segment. Then the breaking space should come into action or the potential of the back brush will be lowered. The back brush, therefore, carries current but never breaks the circuit, because when it leaves a segment the front brush rests on the same and the two brushes are connected. As soon as the potential of the segment connected with the front brush drops, it is disconnected. In this way the back brush carries most of the current and does not spark. The spark upon the front brush is a thin spark without heat, the spark being evidently due to the self-induced currents. To keep this spark at the minimum an automatic shifting device will be used.

The mutual interaction of all these variables, which in their turn are modified by what are constants for any concrete machine, but are variables when the machine is designed, such as the shape of poles, etc., is a very interesting study.

The working portion of the characteristics of this dynamo is shown in the diagram, Fig. 9; two tests are shown. The squares represent 100 watts, as the amperes and volts are on the same scale. When the scale for current is five times that for amperes, the result is shown by curve 3.

The motor used in this system is a Brush series wound motor controlled by a centrifugal governor which, when the speed changes, shifts the commutator into a position calculated to change the magnetic axis of the armature and assist more or less the field magnet strength.

This is shown in Fig. 10.

If the load increases, the commutator must move into such a position as to increase the strength of the field. The weights fall in, the commutator moves backward and the resultant line forward. If we bring the *S* pole of the armature close to the *S* of the field, the armature would revolve either in one direction or the other, if it received a slight impulse. The more we move the magnetic axis forward, the more work will it develop, until the armature magnetic axis reaches a vertical. It is not necessary for the commutator to shift 90°, as a shifting of the contact line acts, as already shown, to still further shift the field.

The motor tested gave 84 per cent. efficiency at 70-brake horse-power; at 80 horse-power (the limit) it would have been somewhat higher. The efficiency must drop at lower powers, as the loss should be about a constant one. I did not have time to obtain figures upon this point.

The dynamo efficiency I can not give, as I had no dynamometer of sufficient size available.

Professor Sylvanus P. Thompson point out that it is higher than with the motor, as in a motor amature, Foucault currents are assisted by the current in the amature, and

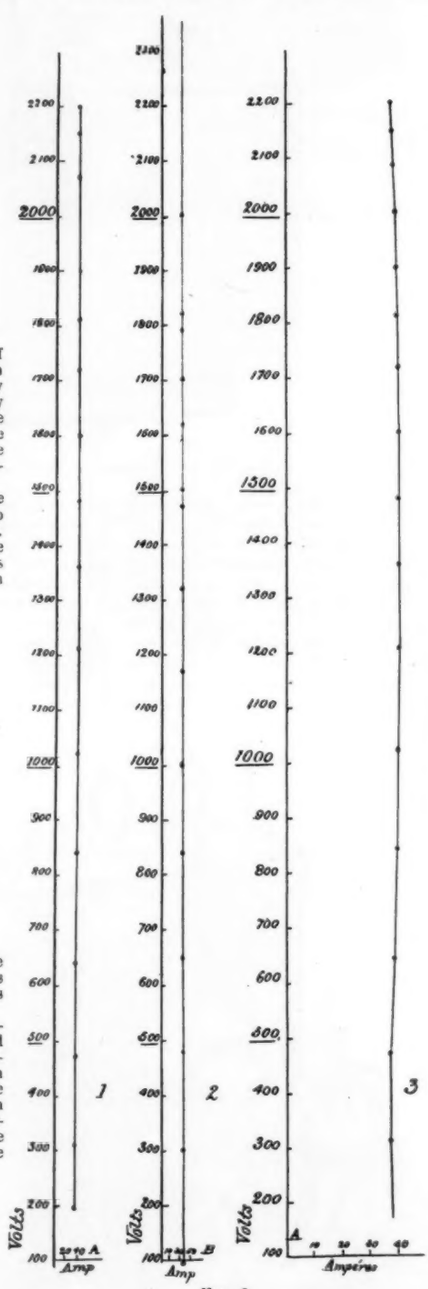


FIG. 9.

in a dynamo the reverse is true.

The striking points in the system are: a generator of great power which cannot be injured by a short circuit. A motor which will not burn up if overloaded, but will stop working. The producer of current, therefore, is not called upon for twice the power represented as being used and for which the motor was sold, and then have to repair the motor to keep the trade. The system being a series one, every device in the circuit which utilizes the current adds to the efficiency of the system, as it decreases the percentage of loss in the wires.

My thanks are due to Mr. Brush for allowing me to obtain the foregoing figures, to Mr. Pfankuche for his assistance, and to my assistant, Mr. Scheible, for rapidly preparing the diagram.

.... A company is about being formed in Baltimore to place in operation the system of telegraphing to and from moving railroad trains, said to have been invented by Baylus Cade, of Raleigh, N. C.

TELEGRAPHIC

.... The following directors of the Pacific Postal Telegraph Cable Company have been elected: John W. Mackey, W. C. Van Horne, George Stephens, Charles R. Hosmer, Richard V. Dey, Albert B. Chandler, Hector De Castor, Edward C. Platt and George Ward.

.... A company is about being formed in Baltimore to place in operation the system of telegraphing to and from moving railroad trains, invented by Baylus Cade, of Raleigh, N. C. Mr. Cade places a wire along the railroad near the track, and the communication is made with the moving train by a drag descending from the arc.

... In the United States Court of Topeka, Kan., recently, Judge Foster decided the case of E. P. Diehl, of Olarhe, against the Western Union Telegraph Company, allowing the plaintiff $1,800 damages. In this action the plaintiff asked for damages on account of the incorrect transmission of a dispatch It was sent by General Powell Clayton, of Arkansas, and when received read: "Forty car loads of ice," whereas General Clayton had filed his copy, reading: "Forty tons of ice." Twenty car loads had been shipped when the error was discovered.

.... At the annual meeting of the stockholders of the Franklin Electric Company, whose telegraphic lines run westward from Chambersburg, Pa., to Mercersburg and eastward to Fayetteville, the following named officers were elected: President, S. Z. Hawbecker; vice-president, Jno. G. Orr; secretary, W. G. Nixon; treasurer, Van T. Haulman; general manager, W. L. Ritchie; assistant general manager, Jacob Fendrick. Jno. G. Orr was elected to serve as treasurer during the temporary absence of Mr. Haulman. A report submitted showed the company's business to be steadily increasing and profitable.

.... Charles H. Wood, Vice Consul General to Rome, reports to the State Department that Signor Enrico Copello, who formerly resided many years in the United States, has purchased the right to sell the Edison phonograph in Italy. As a preliminary step to this enterprise, the Consul reports that Signor Copello visited Rome, bringing with him the first phonograph ever seen in the kingdom. It was exhibited before representatives of the associated press, of the Senate and Chamber of Deputies, leading scientists, and King Humbert. The King dictated a congratulatory message on the phonograph to the inventor, and requested Signor Copello to carry to Queen Margaret, at Venice, a phonographic message. These exhibitions awakened great interest throughout the country, the Vice Consul says, and the columns of the press are filled with handsome tributes to Mr. Edison, and to the inventive genius of the American people generally.

.... "People who have occasion to use the wires frequently are sometimes greatly amused, not to say mystified, by the manner in which messages are mutilated in transmission," said a telegrapher.

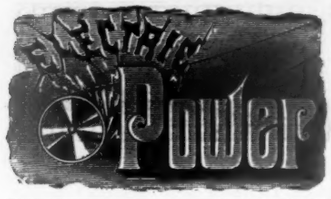
"A prominent commission merchant in the city of Toledo, Ohio, a short time ago was thunderstruck upon receiving a telegram from a Chicago elevator company which read as follows:

"'Offer you two cars minced cats twenty-nine half.'

"A repetition of the dispatch made it read thus:

"'Offer you two cars mixed oats,' etc.

"A bright young operator employed on a press wire in this city some time ago, while receiving an item describing some ceremony in connection with the recent jubilee in Rome, made an amusing error. As received by him, the dispatch stated that Cardinal So-and-So turned toward the congregation, ascended his hands and said: 'O rats, father.' The editor fell off his chair when his eye fell on the paragraph. A correction was not necessary, however, as he understood the sentence was intended for the Latin phrase 'Orate Fratres,' or, in English, 'Pray, brethren.'"



* * Macon, Ga., people desire the introduction of electric power.

* * The street cars of Athens, Ga., will probably be run by electricity.

* * The wiring work on the Amesbury and Merrimac electric road is now under way.

* * Newark, N. J., expects to have rapid transit by electric railways in the near future.

* * Louis Hammersmith is considering the question of an electric railway up the Silver Hills, at New Albany, Ky.

* * It is reported from Memphis, Tenn., that parties will purchase the Prospect Park and Belt Railway and operate by electricity.

* * The Lowell and Dracut electric road using the Bentley-Knight system need more generators, as the cars are running heavily loaded.

* * It is announced that the directors of the Hartford street railway will try the Julien storage battery cars on the Hartford City line.

* * The work of setting poles for the Quincy (Mass.) street railway is under way, and the citizens are said to consider them ornamental.

* * The Connecticut Motor Company are about removing from Hartford to Southington where increased manufacturing facilities will be obtained.

* * A big $200,000 central electric power station is among the probabilities in Cleveland where the progress of electric roads has been markedly rapid.

* * The Oakland (Cal.) Board of Trade has declared in favor of the granting of the electric road franchise from Oakland to Berkeley on Grove street.

* * The Denver Tramway Company proposes, if given permission, to introduce an extensive system of electric railways into the metropolis of the Rockies.

* * The Newport (R. I.) city council has voted to allow the Electric Street Railway Company to run their beach line before the Broadway line is completed.

* * The Saratoga electric railway is beginning to take upon itself a tangible form. The rails are arriving and are being delivered along the proposed route.

* * According to the Cincinnati *Commercial Gazette* within two years or less there will not be a horse in any street railway in Cincinnati. Electricity is the motor of the future.

* * The Metropolitan Street Railway Company, of Nashville, Tenn., have asked for permit to build an electric street railroad. John M. Base and Adolph Dahlgreen are interested.

* * Electric cars are to be introduced on the Broadway and Newbury Street Railway, Cleveland, Ohio. President Stanley hopes to have cars running by electricity during October.

* * Work has begun in track laying for the Brightwood street railway, near Washington, D. C. President Thomas, of the road, is now in the East looking up available electric systems.

* * The Hartford Dynamic Company has received permission to operate an electric storage battery car for purposes of trial and experiment on the tracks of the street railroads of New Haven, Conn.

* * The W. & Dewees Wood Company, it is reported, has secured $10,000 of the McKeesport Railway Company, whose road will be run by electric power probably and extended across the river to Dravosburg.

Should the Duty on Copper be Abolished?

BY C. A. BROWN, IN "WESTERN ELECTRICIAN."

At the recent convention of the National Electric Light Association at Niagara Falls a resolution was adopted providing that a committee of three be appointed to prepare and present to the proper committee of Congress a petition for the abolition of the customs duty on copper, ingot, wire plates, sheets, bars and rods. The abolition of the customs duty on copper in its various forms is not a free trade measure in the ordinary sense of the word. It is not a partisan measure, except so far as it represents the interest of the electrical fraternity of the United States, and other users of copper. Free-traders and protectionists should unite in support of this movement, the only consistent opposition to which must come from the copper mine owners. Even the New York *Tribune*, an ultra-protectionist newspaper, says: "The demand for a removal of all duties on copper ore, pig and bars, will be difficult to resist. It is safe to say that had the Mills bill proposed no change more unpopular or objectionable than that, its public support would have been incomparably greater."

However, we will look at the tariff question as a whole; however great the benefit we consider it has worked for our manufactures, not one substantial argument can be advanced in favor of retaining the duty on copper. We have the richest copper mines in the world, mines most easily worked, and within easy reach of the market.

The duty on copper brings in almost no revenue to the United States Government, for our copper mines produce more than we use, and we do not ordinarily import copper. The sole effect of the copper tariff, therefore, is to enable the mine owners to advance the price for their own benefit. That they have not been slow to take this advantage which has been offered to them is evidenced by the fact that the American price has been uniformly higher than the English price. The result is that Lake Superior copper, which sells in Connecticut, for instance, at 18 cents, sells in London at 14 cents; and it has happened that Lake copper has gone all the way to London, and after being sold there, has been retransported to New York, when, after paying the duty, it has met in competition copper from the same mine which has reached the market by the shorter and less expensive route of the Lakes and the Erie Canal.

It may be said that the present price of copper here is so low, being only about two cents a pound above the price of copper in London, the difference is not worth noticing, and that competition among mine owners having reduced the American price so far as it has, we may depend upon the same competition to reduce the price still further. But the margin on electrical apparatus has been reduced to a point where even the difference of two cents a pound on copper is onerous, and it is not to be expected that the electrical interests will submit to a condition of things which puts it in the power of certain men or a combination of certain men, to advance the price of a commodity which is so large and so important a factor as copper in their business.

Without the duty on copper the mine owners will have the advantages which they now have of mines rich in metal, easily produced, and of a market in easy reach. They will have the added advantage of the increased use of their product, which may be expected when the price is reduced to an equality with foreign prices, and when it is put on a stable basis. Without the duty on copper, those who use it will have the benefit of about the same prices which rule in London, and will not be harassed by uncertainty as to the future state of the market which now embarrasses their calculations.

An estimate of the total amount which has been paid in the United States for copper over and above the price for which the same amount of copper can be bought in London, puts the figure at not less than $2,000,000 for the copper used in the electrical industries alone.

This sum is arrived at by estimating the amount of copper used in electrical apparatus and in circuits. The average of several estimates made by practical men is nearly 100,000,000 pounds. Figuring that the average extra cost of copper to the consumer due to the tariff is two cents per pound, gives the total of $2,000,000.

Wire drawers are not protected on product by a heavier duty than is imposed upon copper ingots, and the result of abolishing the duty on copper wire as well as on copper ingots, would be to put the manufacturer of wire in a better position than he is at present. With the duty on his raw material removed there would be the same or a larger margin for him to work on than there is now with the duty on the raw material, and a corresponding duty on his product. These facts seem to warrant the conclusion that the removal of the tariff by Congress would be an eminently wise legislative act.

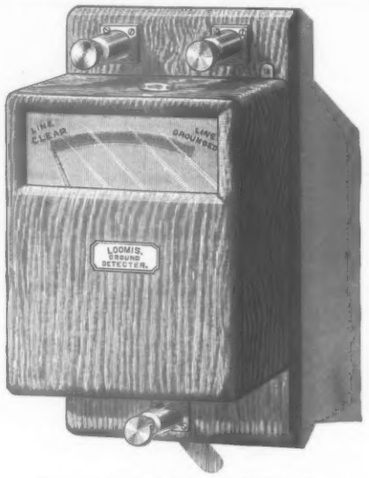


FIG. 3.—LOOMIS GROUND DETECTOR.

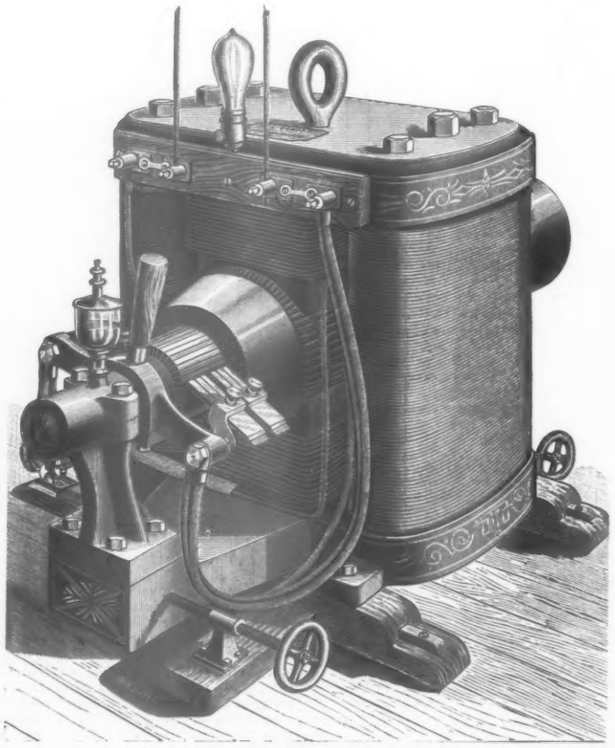


FIG. 1—THE LOOMIS DYNAMO.

FIG. 2—INCANDESCENT LAMP—LOOMIS SYSTEM.

A New Incandescent System—The Loomis Incandescent System.

Among the newer electric lighting systems is the one perfected by Mr. Osborn P. Loomis, and which is now located in this city, with convenient offices in the Welles building, No. 18 Broadway, and a factory in the upper part of the city, a factory formerly used by the Sprague Electric Motor Company before its removal to Schenectady, N. Y. The Loomis Electric Manufacturing Company is devoting its work to isolated plants, and is well pleased with the excellent business secured since opening up in this city. The dynamo and other apparatus and appliances are shown in this issue of the REVIEW. Mr. Loomis claims a number of valuable features for his dynamo, which is a compactly built machine, chief of which is that it is entirely automatic.

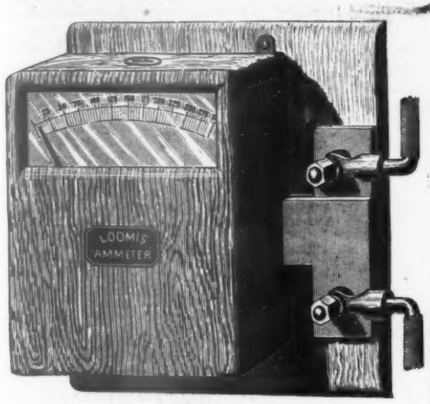


FIG. 4.—LOOMIS AMMETER.

FIG. 5.—LOOMIS DOUBLE POLE SWITCH.

The installation of the Loomis system is carried out in accordance with the requirements of the board of fire underwriters. The wire and lamps are protected by safety devices, which are the exclusive property of the Loomis Company, and, like the automatic features of the dynamo, are fully covered by patents in this and in other countries. The lamps employed are brilliant and durable, and the system in its entirety, and in each individual part, is guaranteed fully equal to any ever brought before the public.

FIG. 7.—LOOMIS MAIN CUT-OUT.

A New Arc Lamp.

We are informed that a new type of arc lamp has been introduced into England from France by the Planet Electrical Engineering Company. The upper carbon is fed by means of an electric motor, which drives a worm and a train of gearing. The field-magnets of the motor are in series with the arc, the armature being connected as a shunt to the field-magnets. The difference of potential at the two brushes of the motor is two volts. When the lamp is burning steadily the motor is at rest, but when the resistance of the arc increases a solenoid core pulls down a lever, making a contact to the armature, which immediately commences to revolve. Should the arc be made too short, the solenoid reverses the connections and the armature revolves in the opposite direction. The advantage claimed of the arrangement is that there is plenty of power to overcome the friction of the slide, and that, with the exception of the solenoid, there are no fine djustments.

FIG. 6.—LOOMIS SINGLE POLE SWITCH.

* * The Yankees are a little too smart for the Frenchmen. The story is told that the manager of the Edison exhibit at the exposition was approached by a journalist, who demanded money for reporting the proposed visit of President Carnot to the Edison department. He was induced to make his demand to the phonograph, which he did, assuring the manager that the President might come and go, but there would be no mention of the fact in the papers if the money was not paid. When President Carnot arrived the phonograph repeated what the journalist had said, much to the discomfiture of the latter and much to the amusement of the President.

A Far-Sight Machine.

Not long ago Mr. Edison made public his intention to perfect a "far-sight" machine, *i.e.*, an arrangement by which a person at a distance can be seen as plainly as his voice can be heard over the telephone wire. There have been other workers in the same field, and one of them, Herr Korsel, of South Germany, has not only effected several important developments, but has actually brought down the invention, it is claimed, to a working basis. The foundation of the apparatus is the ordinary house telephone. Above the diaphragm aperture is a lens similar to the objective of a photographic camera, and above this a translucent glass plate in an elaborate frame. At the right and left of the objective are two incandescent lamps with silvered mirror reflectors. The lamps are lighted by a specially constructed battery. This constitutes the whole outward appearance of the apparatus. The objective serves for taking the picture of the person using the telephone, while the incandescent lamps illuminate his face. Upon the glass plate above is thrown the image of the person using a corresponding instrument at the other end of the line. The action of the apparatus is based on the changing in the photoscope of light vibrations into electric vibrations in the same way as sound waves are changed in the microphone, and on the use of bromo-gelatine, a substance which, in connection with the well-known property of solenium, makes possible the transmission of light.

FIG. 9.—CUT-OUT ROSETTE.

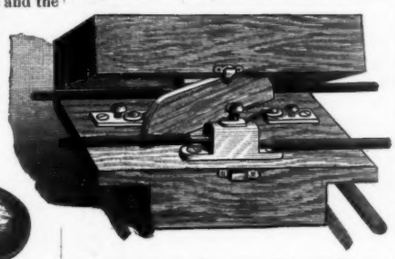


FIG. 10—BRAND CUT-OUT—LOOMIS SYSTEM

In the course of an exhibition of his system in Berlin, Herr Korsel connected his photoscope to a telephone, and had the central office connect him with a business friend in Potsdam, who likewise was provided with a photoscope. The moment the Potsdamer stepped to the apparatus the ground glass plate showed an excellent portrait of him, which, when compared with his photograph, was easily identified. The shape of the head, the smile and the earnest expression of the whole face were perfectly distinct.

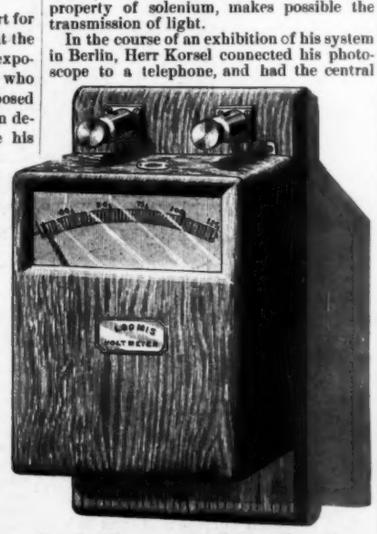


FIG. 8.—VOLTMETER.—LOOMIS SYSTEM.

ELECTRIC LIGHT NEWS

—— The town of Bloomfield, N. J., will advertise for bids on electric lighting.

—— The electric lighting on Cape de la Heve, in France, is generated from a motor which is run by wind.

—— S. H. Whitney, of Hartford, proposes to locate an electric light plant and light the town of West Haven, Ct.

—— The United States Electric Light Company has put a powerful search light in the Philadelphia steamer "Republic."

—— The Boston *Record* says "that the Fort Wayne Electric Co. made a profit in the first seven months of this year of $115,000."

—— The commissioners at Bound Brook, N. J., are negotiating for electric lights to be furnished by the Somerville Electric Light Company.

—— The contract for establishing an electric light plant in the Washington navy yard has been awarded to the Brush Electric Company, of Cleveland, Ohio.

—— The Edison Electric Lighting Company, of New Bedford, having failed to consolidate with the gas company, will proceed at once to enlarge its plant.

—— The Federal building at Albany, N. Y., has recently been equipped with 462 incandescent lights. The work was carried on under the inspection of J. E. Powell, U. S. inspector of government buildings.

—— Trustees Osborn and Connor, of Irvington, N. J., have been appointed a committee to report to the board of trustees at its next meeting as to the feasibility and probable cost of lighting the streets of the village with electric lights.

—— The board of directors of the Westinghouse Electric and the Westinghouse Electric and Manufacturing Companies met the other day in Mr. Westinghouse's office at Pittsburgh, Pa., and declared a dividend of 1½ per cent. for three months, to be paid on the 25th of this month.

—— Mr. T. S. Carman, the energetic agent of the Edison Company at Nashville, Tenn., has just sold to the "University of Tennessee," Knoxville, Tenn., for buildings and grounds, a 270-lamp Edison incandescent light plant to be completed Sept. 5, work now well under way; and also to Jere Baxter, Esq., of Nashville, for "Baxter Court," a 450-lamp incandescent electric light plant, including engine, etc., to be completed Dec. 1st.

—— The Essex County Electric Company is making excellent progress in erecting its lines for lighting West Orange. The poles are all distributed, half of them are set and on two of the circuits wire is being stretched. The West Orange people are anxious to have the lines finished. Under the contract with the gas company the street lamps are not lit on the four nights nearest the full moon in each month, and in some of the heavily shaded parts of the township the darkness is Cimmerian.

—— Mr. W. M. Davis, electrician of the Plymouth (Mass.) Electric Light Co., has devised a new tie for securing wires to insulators where they run through trees. If tied in the ordinary way the swaying of the trees is liable to break the line wire. Mr. Davis' device is made of wire, leaving an opening through which the line wire is introduced. A sheet metal clip is then inserted, the ends bent down and the wire is secured against the possibility of falling, while it can render freely lengthwise. He has secured letters patent on his invention, which seems to be a valuable one.

KINDRED INTERESTS

Hazazer & Stanley. — The well-known electrical supply house of Hazazer & Stanley, 34 Frankfort street, New York, are in constant receipt of orders from all parts of the country for their excellent dust-proof call bell. As an indication of the favor with which these bells have been received it is only necessary to mention that for the past three days they have received orders for 2,250.

John A. Roebling's Sons Co. have just issued a neat little pamphlet, descriptive of their bare and insulated wires, and containing price list, many valuable tables and telegraphic code for ordering. This great manufacturing company is thoroughly abreast of the needs of the electric lighting and power people, and its name is a guarantee of the fact that all work turned out will be of the best quality. Every electric light worker should send for a copy of the new catalogue above mentioned.

The Pond Engineering Co. have secured the contract for furnishing the power plant for running the electric lights of the Libby Prison, War Museum, at Chicago. The old Libby Prison has been removed from Richmond, and set up in Chicago. All the prominent brick and stone being marked, and placed as originally in the building at Richmond. It will be lighted by 600 Edison incandescent lights, and 20 Sperry lights, the dynamos being driven by a 90 horse-power Armington & Sims engine. The Pond Engineering Co. will have the plant installed by September 1st.

The Clark Electric Company's New Catalogue.—The new descriptive catalogue of the arc light apparatus of the Clark Electric Company is a very attractive one, gotten up in a different style from any other electrical work of the kind we have ever seen. The illustrations are particularly fine, and the claim is made that the Clark system is "the most economical system of arc lighting in the United States." This company is now pleasantly located in its new office in the new Corbin building, at 192 Broadway, the officers being James H. Seymour, president; A. Bedell Benjamin, secretary; Ernest P. Clarke, electrician.

The Standard Underground Cable Company.—This enterprising company, with headquarters in Pittsburgh and branch offices in New York and Chicago, has met with such a degree of success that the building of a new two story factory has been decided upon adjacent to the present works in Pittsburgh. The new building will be devoted to the manufacture of Standard weatherproof line wire and W. A. C. fire and waterproof wire, the orders for which are rapidly increasing. Cable orders have also increased very rapidly within the past ten months, so that the company is running up to full capacity in that line.

The Electrical Supply Co., 171 Randolph street, Chicago, Ill., western branch of the Ansonia Company, have recently published a complete little volume of 16 pages, handsomly printed on heavy glazed paper with red border, bound in a leatherette cover, which they will cheerfully send to any one upon application. The book treats especially of the wires and cables manufactured at their factories, Ansonia, Conn. The deserved excellence of the wires manufactured by this company has been fully appreciated in the past, with the result that their sales are simply enormous. In view of this fact, the company have issued this volume describing and giving the prices of some of the wires manufactured and handled by them, among which is their new "Shield" brand wire of very superior insulation, specially manufactured and designed to meet every condition to which a line wire should be put. They also give a complete table of dimensions and resistance of pure copper wire from No. 0000 to No. 40 B. & S. gauge.

Palmer's Electric Signal Box.

A recent improvement in signal boxes, such as are in vogue for police and similar purposes, is just patented by Don A. Palmer, of Chicago, and is a novelty.

The ordinary district messenger or police box is shown, without the face plate, in Fig. 1. The handle *f* being in the normal position, the circuit is open at the contact wheel *k*, but is closed through another contact at *c* under the lever arm *g*. Now, when the lever *f* is drawn downward, *h* is drawn out of the way, and the stop *i* no longer prevents the signal wheel *k* from revolving through the force of the spring which is wound by the downward motion of the lever *f*. As this wheel *k* revolves, the several projections shown come in contact with the spring 6 and close the circuit, sending to line a dot the

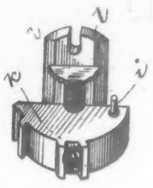


FIG. 2.

same as closing a telegraph key sends a similar signal to the distant station. In the cut the reader will notice a dividing line cutting this wheel *k* into halves.

These halves of the wheel are shown separated, in Figs. 2 and 3, and it will be noticed that at *l*, *l*, there is a bevel which fits into the corresponding grooves *l*, *l*, of Fig. 3, as shown in perspective.

The object of the invention is the providing a means of special signal for police or other public officers, who may thus make known their identity at the same time they announce their presence on the line.

In the box, as shown, policeman number 33 has removed the blank half of the signal wheel at box number 22, and introduced his personal key. Now, when the box is pulled by him the record at the central station will show,

— — — — — — — — — —

which translated will read: "Officer 33 is at box 22."

When he leaves the box he replaces the blank and carries his private signal with him.

In the face plate, not shown in the cut, there is an opening in front of the wheel *k* covered by a removable shutter which only the proper person can open, and through this the change of signal is made—that portion of the wheel which carries the number of the box being permanently fixed, the removable portion cutting no figure in the signal number.

It is thus possible and practical for each officer to constantly inform the central station of his whereabouts during the hours of patrol duty.

For further particulars, address Don. A. Palmer, 108 Adams street, Chicago.

The Austrian man-of-war "Saida," which is now visiting our waters, is splendidly equipped with electrical appliances, including two powerful electric search lights, together with electrical devices which enable each individual gunner to fire his gun by

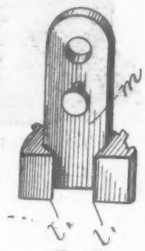


FIG. 3.

pressing a button; or a whole broadside can be fired simultaneously from the captain's bridge by a similar arrangement. The officers speak highly of the efficiency of these appliances, and state that their entire navy is being equipped with electrical devices.

During this season the street railroads at the seashore are reporting very heavy business, and the cars which operate upon these roads are very often crowded to their utmost capacity. We understand that upon August 11th the electric railway at Atlantic City, N. J., operated on the Sprague system, carried 42,600 passengers. Every car in operation was crowded with passengers, and the entire equipment of 16 cars were in constant service. Each car besides carrying its own load of passengers drew one trail car also loaded, and in some cases two trail cars were drawn. In spite of this demand upon the electric motors the cars made their usual speed of from 15 to 20 miles an hour, and ran without interruption or the loss of a single schedule trip. The regular schedule of one of the electric cars at Atlantic City includes 18 trips per day, or about 120 miles. This is the lowest schedule allowed for any car, and many make even more than this. Considering the loads which these cars are obliged to carry and the fact that all the cars are kept in constant operation, a mileage of this kind is particularly significant and one which shows the reliability of the apparatus. Since this line has been put in operation, about three months, the cars have made over 100,000 miles.

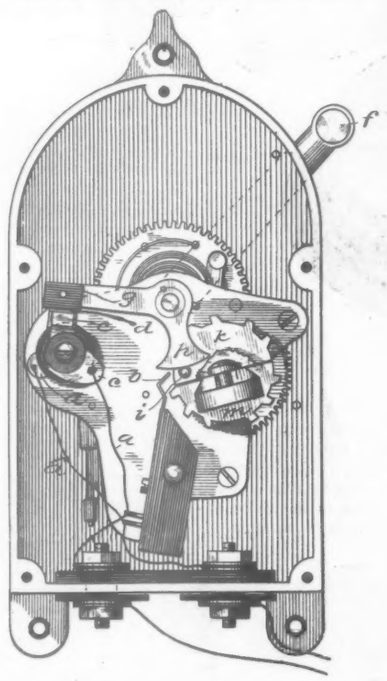


FIG. 1.—PALMER'S IMPROVED ELECTRIC SIGNAL BOX.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENTS OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING AUGUST 20, 1889.

409,169 Electric valve; M. G. Wheeler and A. M. Clark, Marshalltown, Iowa.

409,178 Secondary battery; Camille A. Faure, New York. N. Y., assignor to Electrical Accumulator Company of New York.

409,181 Conductor for electricity. 409,182 Distribution of electrical energy. 409,183. Joint for electric mains. 409,349 Dynamo electric machine; Sebastian Z. De Ferranti, Hampstead, Co. of Middlesex, England.

409,237 Electrical railway system; Elias E. Ries, Baltimore, Md., assignor to Ries and Henderson, same place.

409,259 Galvanic battery; Geo. C. Ward, Boston, Mass., assignor to the Advance Electrical Company, Saco, Me.

409,291 Process of making solution compounds for galvanic battery; William P. Kookogey, Brooklyn, N. Y., assignor to the Kookogey Electric Company.

409,364 Automatic electric fluid releaser; B. S. Molynfut, Minneapolis, Minn., assignor to National Water Supply Company of Minnesota.

409,365 Gas battery. 409,366 Process of obtaining electricity from gas battery; Ludwig Mond, London, Eng., and Carl Sanger, Norwich, Eng.

409,390 Arc lamp; Robert D. Carson, Philadelphia, Pa.

409,437 Electrical dental instrument; Fred. Vernettes, Hannibal, Mo.

409,448 Secondary battery. 409,449 409,450 System of electrical distribution; Chas. S. Bradley, Yonkers, N. Y., assignor to the Bradley Electric Power Company, N. Y.

409,463 Armature core for dynamos; Daniel Higham, Philadelphia, Pa.

409,470 Apparatus for treating animals by electricity; G. M. Lawrence, London, Eng.

409,565 409,566 Distribution of electrical energy; Sebastian Z. De Ferranti, Hampstead, Eng.

409,603 Trolley for electric railways; Jno. G. Dickson. Robert Dickson and Peter Snyder, Pittsburgh, Pa.

409,628 Safety fuse for electric conductors; Walter S. Bishop, New Haven, Conn., assignor to himself and Frank B. Pardee, same place.

409,646 Brush-holder for dynamos; James M. McClellan, St. Paul, Minn., assignor to Geo. H. Finn and Jno. E. Munson, same place.

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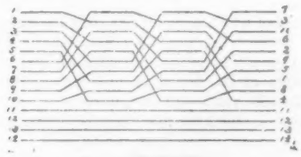

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THIRD.—It lights instantaneously, and vibrates while the finger remains on the button; a second pressure of same button extinguishes the gas without vibration.

FOURTH.—Its operation is positive, the electric impulse being sure to leave the gas-way wide open or entirely closed.

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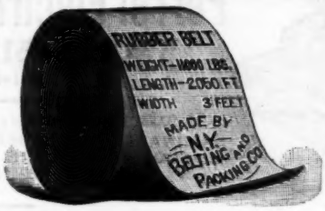

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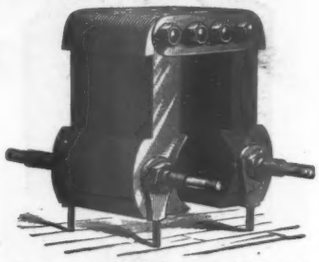

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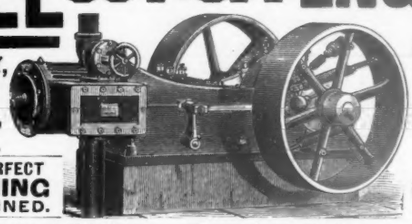

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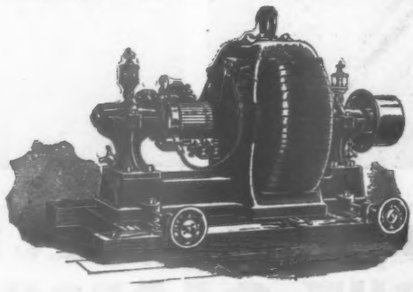

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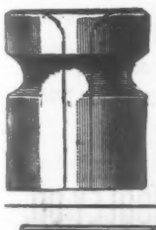

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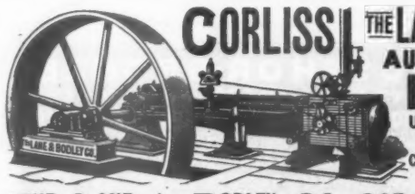

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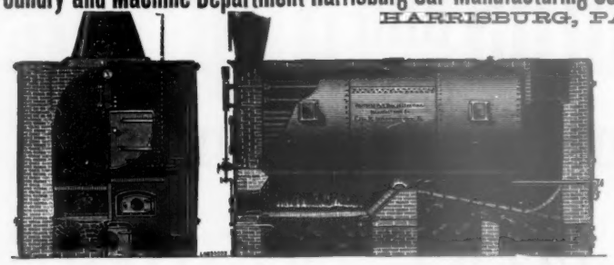

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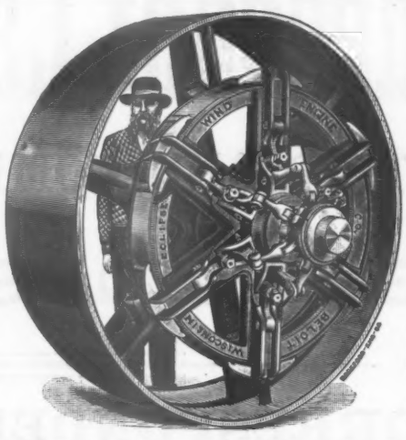

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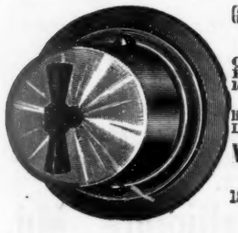

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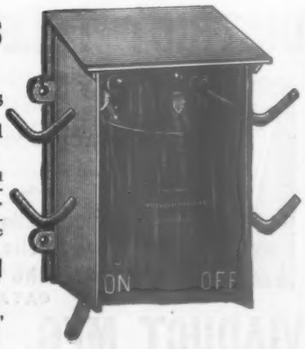

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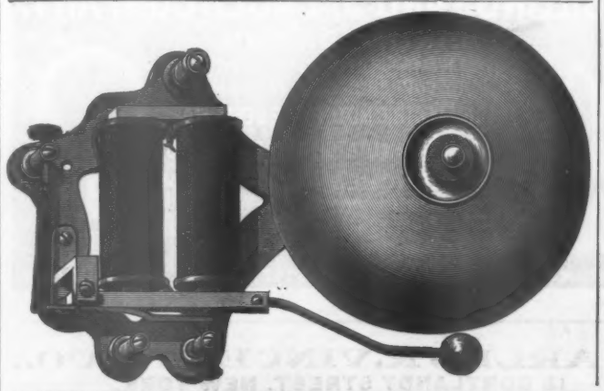

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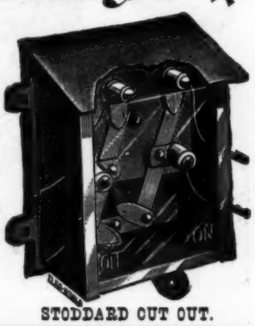
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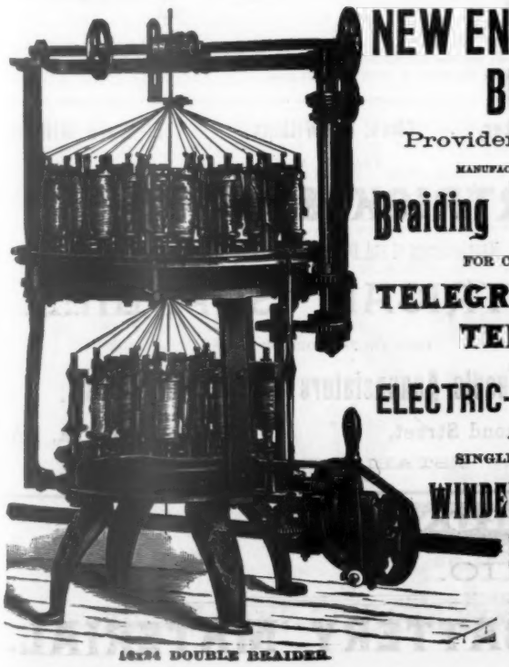
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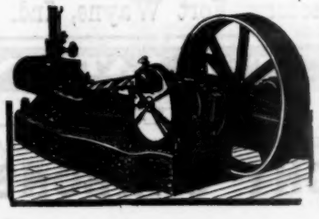

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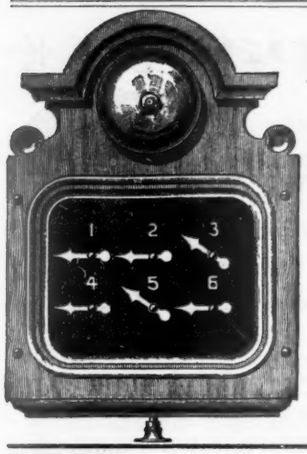

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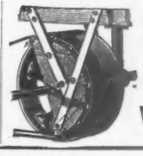

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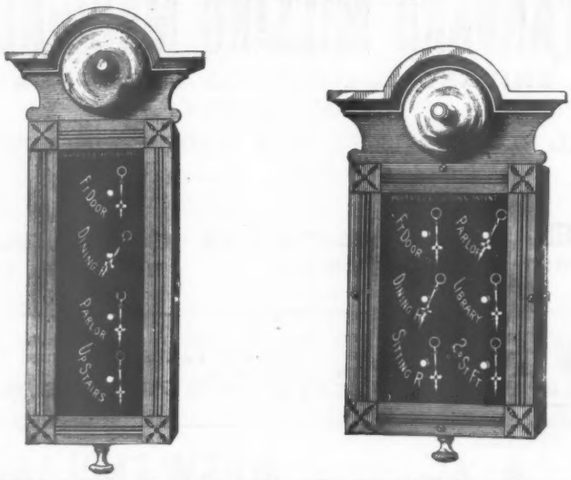

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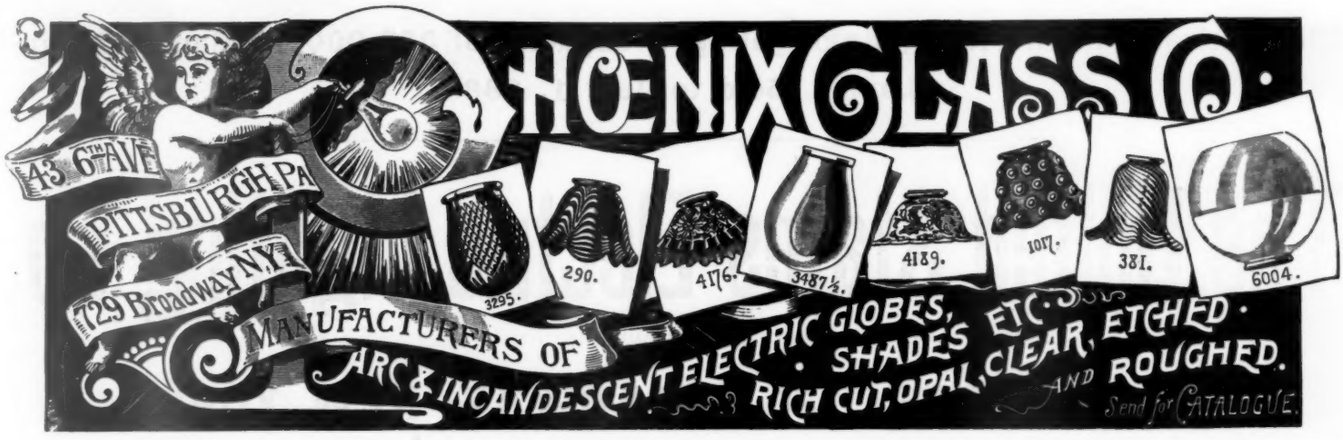

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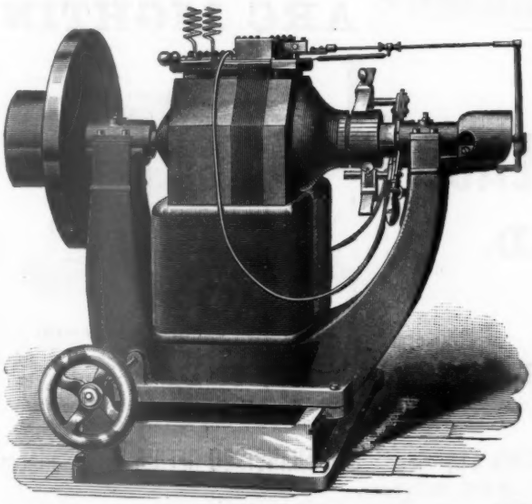

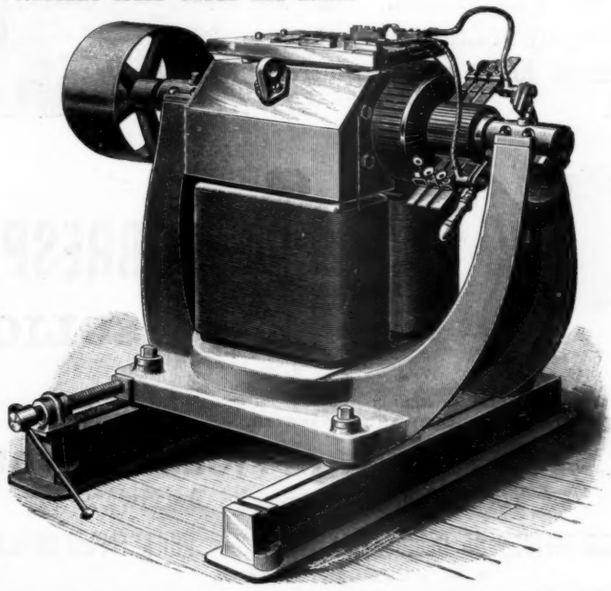

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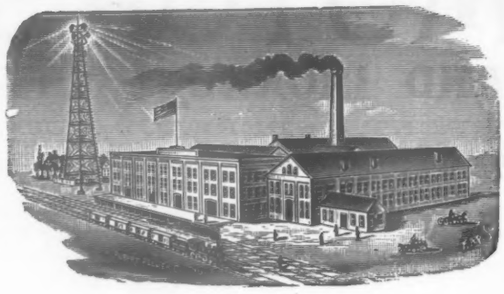

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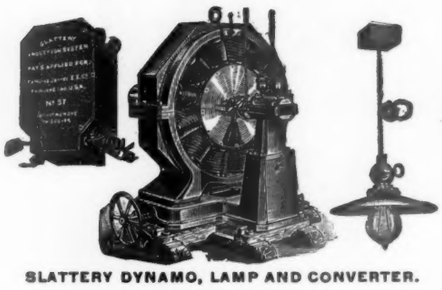

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